

Chemical Weekly

VOL. XXXVI

DECEMBER 18, 1990

NO. 15

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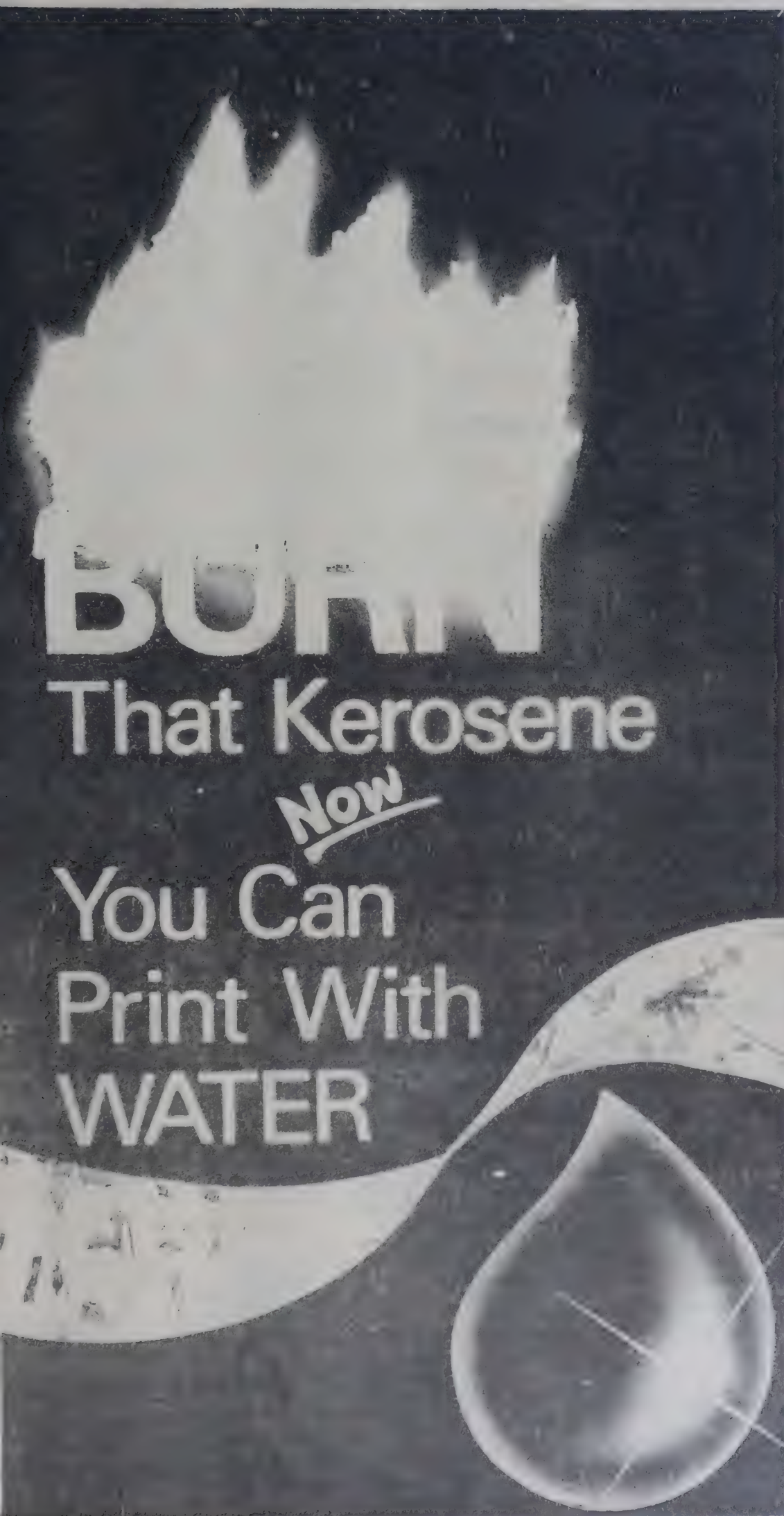
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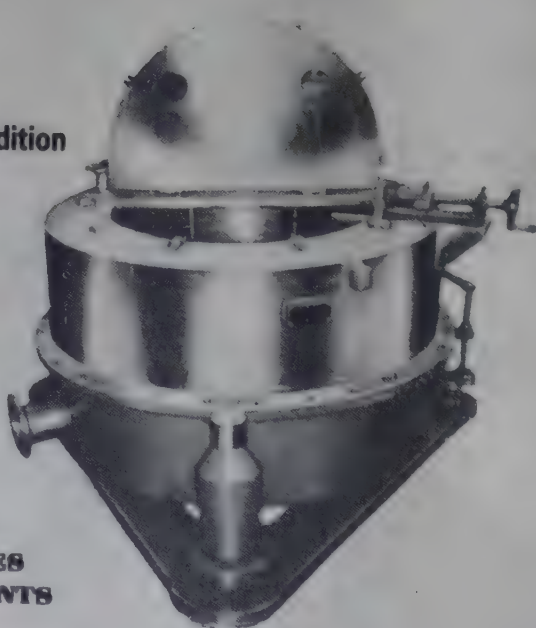
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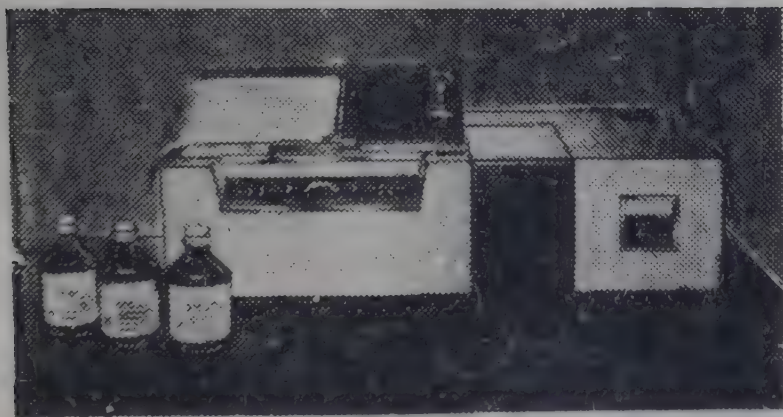
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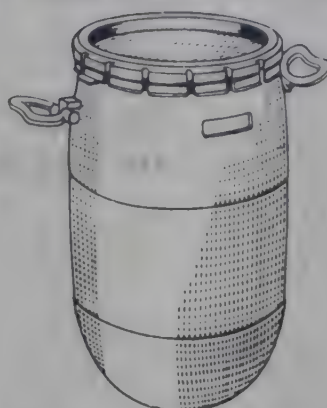
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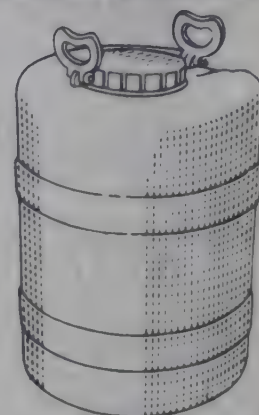
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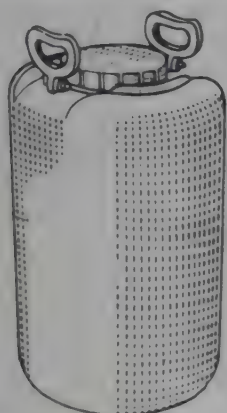
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30 Kgs. Round Drum
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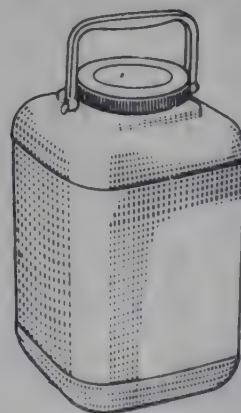
50 Kgs. Round Drum
— 6" Cap



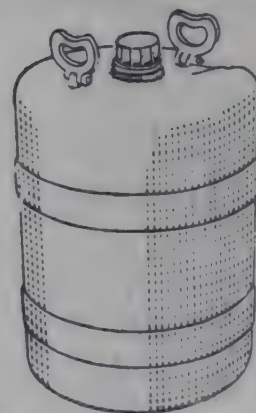
30 Kgs. Round Jar
— 6" Cap



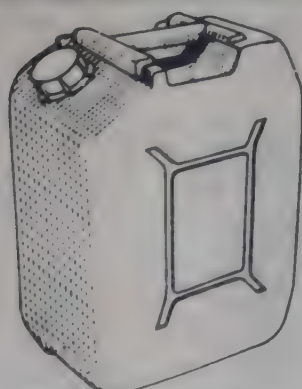
20 Kgs. Round Jar
— 6" Cap



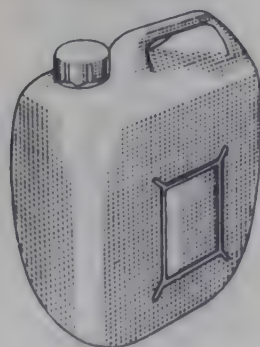
6 Kgs. Square Jar
— 4" Cap



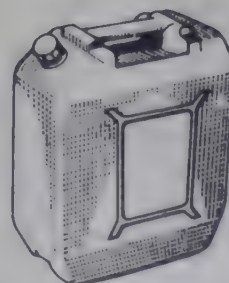
50 Kgs. Round Drum
— 2" Cap



30 Ltrs. Jerry Can
Stackable



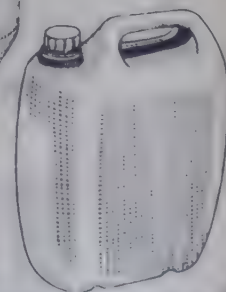
20 Ltrs. Jerry Can



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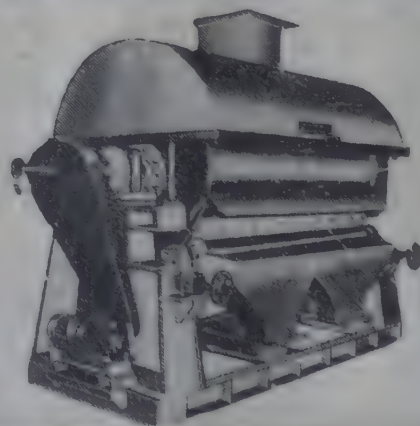
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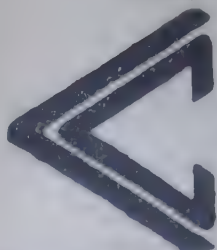
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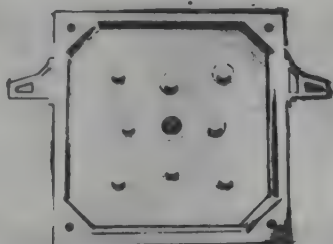
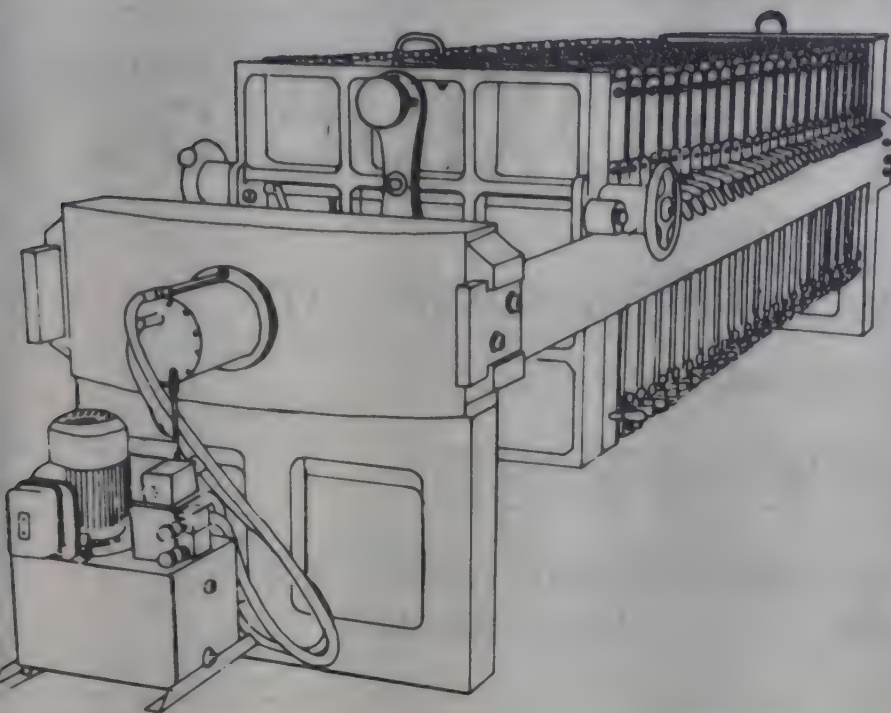
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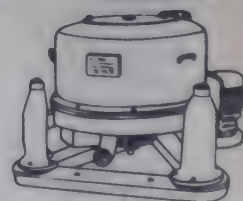
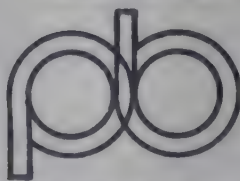
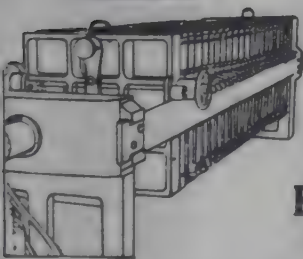
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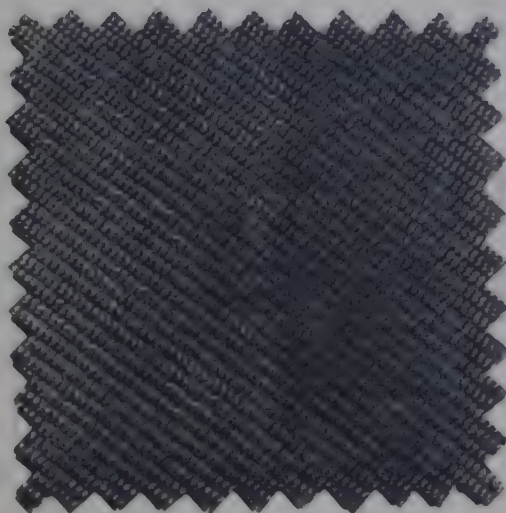
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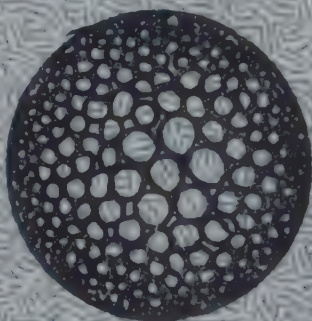
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The Greenhouse Effect and World Agriculture

Half the world's population — most of them low income families — live on rice. However, with the increase in greenhouse gases and a corresponding four degrees centigrade increase in temperature by the year 2050, rice production in the world is expected to plummet by 25 per cent.

In a situation where 500 million people stay hungry already, this prediction of the Food and Agriculture Organisation (FAO) is indeed alarming.

The picture for agriculture and food security in the 21st century is extremely bleak. The burgeoning population expected to cross the ten billion mark, the prices are rising at a frenetic pace and the purchasing power of the rice eaters is severely eroded.

Despite the United Nations and other international co-operation ventures, the world is unable to share the food available. Climate change is expected to further widen the north/south gap in agricultural production.

What is worse as Mr. D. Norse, senior policy and planning co-ordinator at the FAO, pointed out to a group of science writers, the nuances of climate change on agricultural resources are still being worked out. FAO experts find themselves having to plan for an uncertain future.

Countries of south-east Asia who grow rice and live on it have good reason to worry. The cloud cover or umbrella created by greenhouse gases will reduce sunshine and thereby have a direct impact on paddy cultivation.

It has been established by agriculture scientists that production of rice is 25 per cent more in the dry season when there is sunshine than in the monsoon when there is a cloud cover. But in 20 to 30 years when carbon dioxide and other gases trap heat there could be a cloud cover round the year.

Ironically enough, of the seven billion tonnes of greenhouse gases being released into the earth's atmosphere, agriculture and forestry contribute 14 and nine per cent respectively. Carbon dioxide, methane and nitrous oxides are the main greenhouse gases.

Methane is derived from the anaerobic decay of organic matter such as in the digestive tract of livestock (25 per cent), paddy fields (35 per cent) and animal waste (12 per cent). Nitrous oxides are derived from land clearing — deforestation, fuel wood burning and use of mineral nitrogen fertilizers.

Temperature increase is not expected to be uniform. Countries closer to the poles will be the worst affected. Droughts and floods may be more frequent and intense with longer spells of dry and wet periods. Sea level is to rise by 30 to 50 cms by 2050 and by a metre by 2100.

This would mean salt water intrusion into ground water, disruption of aquaculture schemes, marginalisation of certain irrigated, rainfed crop production systems and flooding of wetlands. With soil moisture reducing and temperatures rising, desertification will increase in some regions. The Sahel region of Africa will be further affected by a climate change. Between 1965 and 1985 Sahel went through long periods of drought. Some cold areas of developed countries, which have remained ice-bound are (with rising temperature) likely to be turned into new agricultural lands. This land, however, may be less fertile and less suitable for arable crops than land "lost" further south because of drier conditions. The north-south gap in agriculture production or production potential may widen.

Globally the total area under wheat and other temperature food crops (white potato, sugar beet) is not expected to vary significantly. But the FAO fears there would be substantial regional or sub-regional shifts in area and production potential that could undermine food security.

In all areas with Mediterranean climate, the water balance is likely to be negatively affected resulting in reduced discharge and irrigation potential of important rivers flowing through semi-arid areas. Northern Africa, South Europe and North of Central America may be headed for drier conditions.

In the Tropics, the rise in temperature will be less marked and may be accompanied by the weakening of the monsoon. This is expected to reduce highland areas currently suitable for temperate food crops.

The growth and yield of crops will vary. But high temperatures can induce pollen sterility in rice and wheat. By ensuring flowering in the early hours of the day, however, this risk can be reduced. Similar genetic changes are likely to affect cultivation of white potatoes and other food crops.

Climatic changes will affect insects, pests and weed growth. Higher temperatures and co-enrichment is expected to increase weed production.

Global marine fish production may be severely affected by climate change though individual fish stocks may suffer. Areas of high production may shift polewards. Inland fisheries, however, are likely to be affected by floods and droughts. Extensive shrimp and mullet ponds throughout Asia could be flooded.

Most of their hatcheries are situated close to the sea. Some 2.7 million tonnes of sea weed and 2.1 million tonnes of molluscs are cultivated in the shallow, inshore waters of Asia. Bangladesh, India, Malaysia and Thailand are rich in marine and aquaculture production but this may now be affected by flooding of coastal areas due to rising sea level.

While the annual rainfall is likely to increase, this is unlikely to compensate for the increased evapotranspiration and larger water demand expected in some areas because of rising temperature.

While working towards reducing greenhouse gases, FAO has pleaded for more efficient use of water. Improved water saving techniques where water is directly applied to the crop roots; water transport in closed conduits and comprehensive system monitoring and management, better water harvesting and soil conservation has been mooted.

An inter-agency action programme for water and sustainable agriculture development has been proposed.

As against these distressing portends for the future, the current trends for the coming year is far from depressing.

With the south-west monsoon in Asia developing normally, the harvest of winter sown crops virtually completed and that of spring crops starting, the influence of weather conditions on 1990 world cereal production is diminishing and the global supply/demand outlook for 1990-91 continues to improve, says the FAO in its *Food outlook*, September 1990.

For the first time since 1986, world production is likely to be sufficient to meet estimated consumption and current indications point to a record global cereal production, reduced import demand and a small increase in global stocks. Nevertheless, at the end of 1990-91 season, global carryovers in cereals are still expected to remain close to the minimum FAO considers necessary to safeguard world food security.

Moreover, while stocks of wheat in the major exporting countries are projected to increase, their holdings of coarse grains will fall for the fourth year in succession and their aggregate stocks of cereals will not improve significantly.

But, reflecting the easier supply/demand situation, cereal prices are declining prices of wheat and low quality rice are around one-third lower than at the corresponding time last year. By contrast maize prices remain higher reflecting the persistent tight situation for coarse grains.

Crop prospects remain favourable in all major growing areas and FAO's forecast as of September 1990 of global cereal production in 1990 stands at a record 1,941 million tonnes. This is nearly three million tonnes higher than projected in August and 66 million tonnes or 3.4 per cent above last year's output. Most of the increase in production will be in developed countries, but output in developing countries is also expected to show some growth. Compared to 1989, global production of wheat is expected to increase by nine per cent to a record 590 million tonnes.

Coarse Grains

Output of coarse grains is forecast to increase by 1.5 per cent to 835 million tonnes and that of paddy by 1.5 per cent to a record 515 million tonnes. Compared to August, the forecast for wheat, is two million tonnes higher. The forecast for coarse grains is virtually unchanged from August at 835 million tonnes. The fore-

t for paddy production is also unchanged, reflecting normal development of the monsoon in Asia.

AO's current forecast puts world supplies of cereals 1990-91 (production in 1990 plus stocks carried forward from 1989-90) at 2,065 million tonnes. This is three million tonnes higher than estimated in August and most three per cent higher than in 1989-90 mainly due to an increase in production of wheat. Global supplies of wheat in 1990-91 are expected to increase by nearly eight per cent to 707 million tonnes in August, but those of coarse grains are likely to decline by around 0.5 per cent to 963 million tonnes, as the small increase in world production is more than offset by the lower 1990-91 opening stocks. Early indications are that global supplies of rice could increase by about two per cent to 395 million tonnes.

The harvesting of wheat in Asia is virtually completed. The region's 1990 output is provisionally estimated by FAO at 199.3 million tonnes, slightly higher than the forecast in August and some six million tonnes or three per cent more than last year. The increase reflects bumper harvests in China, India and Pakistan.

The outlook for the main season crops of coarse grains is mostly favourable so far. Following generally abundant and widespread monsoon rains in China, the area planted to coarse grains is expected to have increased from last year, while the weather has been generally favourable so far. Crop prospects also remain favourable in India. However, maize production in the Philippines is expected to be reduced due to adverse weather, particularly drought, early in the year. In Pakistan, the danger of locust infestations to maize still persists.

Paddy Output

The 1990 output of paddy in the region is forecast at 75 million tonnes, nearly two per cent more than the previous year. The increase is expected to come largely from the two main producing countries in the region, China and India. In China, widespread rainfall throughout the growing seasons for the early and intermediate summer/autumn crops is expected to result in improved yields, while early estimates of planted area point to a rise of 1.5 per cent from the previous year; recent official reports confirm that a bumper intermediate crop has been harvested. In India, the paddy production target for the 1990 season is 110 million tonnes, four million tonnes (four per cent) above last year; monsoon rains so far have been normal with good precipitation recorded in most states, so that this target is likely to

be achieved.

In Bangladesh, a bumper output similar to last year's production of 27.7 million tonnes is expected, while outputs are likely to rise slightly from the previous year in Cambodia, Laos, Myanmar, Pakistan and Thailand. Some shifts in the planting of the different types of rice are expected in Pakistan, due to recent changes in Government support price policies. The harvest outlook is somewhat less favourable in Indonesia, Japan, the Philippines, Sri Lanka and Vietnam.

In Indonesia, a marginal downturn from the previous year's output is expected due to pest infestations which affected the main season crop. The situation is more serious in Sri Lanka, where 1990 output is expected to remain below average after the sharp decline in the previous year. In Japan, the Government procurement price for rice has been lowered by 1.5 per cent and this together with the area diversion programme, is expected to result in a smaller planted area. In the Philippines, output in 1990 is targeted to rise above the 8.9 million tonnes harvested in the previous year; A "Rice Action Programme" has been launched to provide increased support to rice production, but financial constraints, especially as a consequence of the recent earthquake, has resulted in a further reduction in funds, which could hamper the realisation of this target. In Vietnam, the situation is currently uncertain as the planting of the 1990 main season crop has only just been completed; recent reports indicate a shortage of fertilisers, which could affect the current crop; last year, Vietnam harvested a record crop of 18.4 million tonnes, three per cent higher than in 1988.

The Food and Agriculture Organisation of the U.N. hit upon a truly tantalising theme for the World Food Day of 1990: Food for the future. The immediately preceding annual themes were devoted to exhaustive explorations of the nature and role of a particular section of the community or a specified element of the matrix, in relation to food and agriculture production — be it environment, rural youth, small farmers, fishermen, rural poverty or women in agriculture. Such a narrow beam, sharp pointed quest for the linkages and leverages that lend strength to the overarching global food security superstructure has no doubt its value, but it also carries with it the twin risks of the wood being missed for the trees and of the minutia of the present cluttering the pathways to the future.

Food security does not merely stand for adequacy of supplies through augmentation of production, although this indubitably is the first basic desideratum. Erratic pro-

duction patterns, supply imbalances and fitful availability without regard to the time and place of need can rob statistical claims of quantitative increases of much of their meaning and purpose. Stabilising supplies through stabilisation of markets, food reserves and arrangements to meet emergencies, and securing access to available supplies, especially for the part of the "bottom billion" of the world — the poor, the deprived and the disadvantaged — of whom 80 per cent or more live in developing countries, assume an importance equal to that of augmented production. In brief, if food security is to serve as an effective antidote to hunger and malnutrition, it should ensure that all people at all times have both physical and economic access to the basic food they need.

Grave Repercussions

The demands of the future, unless fulfilled, will have grave repercussions on the stability of nations and Governments, for the hungry are no longer willing to take their plight lying down; in other words, food security is going to get closely intertwined with national security itself. Also, food security is indivisible in that the insecurity of some will in due course engulf all, and so, the world, let alone a region or a group, cannot afford to live three fourths hungry and one fourth sated.

Leaving aside the future for a moment, how does the present look? In global terms, cereals production can be said potentially to be sufficient to meet emerging needs. In the last 20 years alone, there has been a spectacular rise in production from 1,103 million tonnes to 1,684 million tonnes. India more than tripled its produc-

tion of foodgrains from 52 million tonnes at the time it became independent to a projected 178 million tonnes this agricultural year. China, with approximately the same cultivable area (140 million hectares) as India, with less land per capita (0.09 hectares as against India's 0.22) and much less area under irrigation (10 million hectares compared to India's more than 100 million hectares) produced 391.5 million tonnes of foodgrains in 1985-86 when India could touch only 160 million tonnes. The panorama of possibilities is endless and dramatic opportunities are waiting to be seized.

According to one estimate, over the long haul the carrying capacity of the spaceship earth in terms of human beings can be as high as 40 billions and even the developing regions not less than 30 billions with available high farming technology. Africa can sustain 2 billion, said, with only a moderate increase in crop production. Its population three times its present 500 million, the absolute maximum of food production potential of the developing world, comprising Africa, Latin America and Asia, has been computed at 36 billion tonnes of food (or its protein equivalent) each year. Add to this, the discovery of the Indian experience that farm production is by and large neutral to the size of the farm, the alluring prospect that beckons becomes irresistible.

Or, take fish harvesting: The World Conference on Aquaculture (1976) projected a possible five-to-ten fold increase in aquaculture production by 2000, and by this standard, there should be no difficulty in responding to the call of the U.N. to increase the present 10 million tonnes catch to 115 million tonnes by 2000.

— T.P.S. I

CHEMARENA

L. VENKITESWARAN

Ethanol for fuel use

Problems with supplies of petroleum always lead to the question of using ethyl alcohol as a fuel for motor vehicles. This is invariably ruled out in the Indian context even if we claim to produce the lowest cost ethanol from sugarcane molasses. The latest crisis in the Gulf has again reopened this question. It is reported that a committee headed by the Minister is to examine the potential for such usage. Some data on use of sugar for ethanol have been indicated -- as 8 kl per hectare of sugarcane. The present idea seems to be to use ethanol in the farm sector as a substitute for diesel which has an acute short supply. On the other hand the Alcohol Producers Association wants the use of ethanol in the traditional way, of admixture with petrol at 15 to 20% by volume.

India did have a pioneer programme for using ethanol -- power alcohol or 99.5% volume product -- in a mix with petrol over most of the North-west India in the fifties. But the quantity was small as also our requirements of petrol -- at that time imported as the main source -- were yet to be established. Sugar factory effluents in the areas of UP far away from ports was causing serious problems in disposal. The country was subjected to prohibition of consumption of alcoholic liquors. The policy now prevailing only in Gujarat. In this context the policy of ethanol use in fuel (as 20% in petrol) was enforced by law over specified notified areas with the willing cooperation of the foreign-owned oil companies. The logistics of movement of ethanol was solved by the mixing being done at the various bulk depots which in turn supplied the mixture to the retail pumps. The Government did not lose a rupee as taxation was at the same level on alcohol as on petrol. The oil companies lost nothing because they got the costs and same profit margin on the ethanol component of the mixture.

Things changed quickly in the late fifties and early sixties when the potential of chemical usage of ethanol was realised and major programmes for such organic chemicals and plastics took shape. The objective of prohibition was a joke in most states and the demand for motor use began to hold sway and gobble up large quantities of ethanol (rectified spirit) particularly by states

which had little production inside their states. The supplies inter-state of rectified spirit ensured that there was no surplus anywhere after the limited chemical use also came up. It is in this context that the use of ethanol as fuel was totally withdrawn and the Power Alcohol Act also removed from the legislature. The producers began to concentrate exclusively on the rectified spirit of 95% volume which was adequate and the additional process of dehydration to 99.5% plus was discontinued, the equipment scrapped or diverted for other uses/expansions.

Hence at the present time there is only the 95% grade of rectified spirit which cannot be blended with petrol. So if ethanol is to be used as a motor fuel there is the need for large extra investments and complementary blending arrangements at petrol depots and if necessary some kind of legislation for compulsory use of the blend. It is also not clear if the newer Japanese design cars -- Maruti, the most used car -- can straightaway use the blend.

There is need to set our priorities right and devote all our efforts to obtain the maximum usage of ethanol as a chemical feedstock. Our sugar production has reached very high levels and may cross 15 million tonnes in the next few years. The potential for ethanol is in the region of 6,00,000 tonnes a year after meeting the demand, for potable use. While this can lead to between 3,00,000 to 5,00,000 tonnes of chemicals depending on the products, it is not significant in terms of our demand for motor fuel -- perhaps 10% of the total for India or 20% of the demand in UP and Maharashtra. The fuel use should have the lowest priority unless there is need to make and use Ethyl Tertiary Butyl Ether as a gasoline component for getting the required octane rating. There is also too much effort at exports of ethanol which should really be a stop-gap arrangement until new programmes for chemical use go on stream. Related problems on controls and taxation have to be resolved.

The era of ethanol as fuel will surely start in two decades considering the depleting oil reserves. For the present the chemical use should have precedence.

Drugs adulteration

We often read of adulterated, non-standard, spurious and even non-existent drugs in packs similar to the original or even in same bottles with labels, that plague the Indian market. Non-standard products and products filled in by mistake have led to several deaths in hospitals. The small scale sector has probably more such suppliers who corner contracts for supplies to hospitals with dire consequences to the patients. It must indeed be a problem for proper and adequate control and testing of the products. However this piece is on the international scene of spurious drugs as described in a recent issue of *Newsweek*. The picture in India may not be seen as alarming.

Newsweek refers to very important drugs such as Adria-mycin and Zantac in spurious packs marketed after several intermediates stages in different countries and finally marketed by reputable distributors who were probably unaware of what they were doing. In Nigeria it is reported that over a fourth of the drugs are fake. Italy was reported to be the headquarters of drug piracy but this was more the piracy of patent rights of foreign producers. In India we had a case of diethylene glycol replacing glycerine in medicinal syrups resulting in several deaths. This is apparently not uncommon and the *Newsweek* report refers to diethylene glycol substitut-

ing for propylene glycol in paracetamol syrup. In a particular case of spurious drugs tracked down to its source it appears that the raw ingredients were from Turkey, Singapore and processed in Greece and packed in counterfeit vials with identical labels and sold to a broker who in turn supplied for sale to a Dutch distributor - of Zantac the anti-ulcer drug which only alleviated the complaint not alleviated it. There are many cases of vital drugs including the antiviral, adriamycin and even insulin. It is easy to cut down the dosage by the repacking as this may not lead to any early mortality.

One problem is the high cost of the branded drugs -- sometimes as much as ten times actual costs of a generic product. Even simple drugs like paracetamol and ibuprofen sold in USA cost several times the price in India. But that is no justification for spurious and low strength drugs. The world pharmaceutical industry which is a \$150 billion industry has to sit up and take effective countermeasures and WHO may have to take initiative. India is fairly well placed and considering the volume of sales the adulteration or faking is of a low order -- certainly less than in food materials or cosmetics and other consumables. Even so, stringent measures and quality control are called for.

Improved membrane for caustic soda

The membrane process is steadily taking over the electrolysis of salt to caustic soda/chlorine. Japan is in the forefront both in the changeover as well as in the technology for the membrane and cell designs. With nearly 30% reduction in electric power required as compared to the mercury cell and the steady rise in cost of energy the economics are weighted in favour of the membrane process but existing producers based on mercury cells, particularly in India have not been enthusiastic so far. Apart from higher costs for brine treatment to make it of the rigid specifications for the membrane cells, there has been the cost of conversion of a 35% lye to the required 50% -- thus neutralising the reduction in energy cost for electrolysis. Now there is a revolutionary new development by Asahi Chemical of

Japan which results in the 50% lye direct from the membrane cell. It was surmised that the hydrogen formed a layer on the surface which decreased cell efficiency above the 35% level of caustic. Now Asahi have added a layer of a proprietary product to the cathode surface which avoids this build up and enables direct production upto 50% caustic soda lye. The membrane is termed FX50 and two of its "zero gap" electrolyzers are claimed to save energy with up to 50% concentration and a purer caustic of below 10 ppm chloride.

India will have to take up revamping of electrolysis wherever necessary and atleast adopt and use the available designs from abroad and not wait years for indigenous matching developments.

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PHOSPHATIC UNITS

Centre rejects demand for compensation

The Union government has rejected payment of compensation to those phosphatic units which have shut down from January to March last year as a result of non-availability of imported raw materials, namely ammonia and phosphoric acid. The government is also unlikely to pay up for loss of production in the current year on account of similar shortages.

The fertiliser industry had demanded that the government should make up the losses of standing charges and profitability to the phosphatic units. The figure worked out for loss incurred last year was roughly Rs. 850 per tonne of finished product (diammonium phosphate) and a slightly lower figure for complex fertilisers.

The industry had calculated that the farmgate cost of a tonne of DAP produced indigenously on the basis of \$432 per tonne (CIF) price of phosphoric acid was Rs. 6,100. As against this, the actual cost to the economy for importing a tonne of DAP on the basis of the weighted average of international prices for last year was only Rs. 4,800. In other words, for every tonne of imported DAP, there had been a saving in subsidy to the tune of Rs. 1,300 because the domestic phosphatic units were closed.

The strategy of importing DAP and not phosphoric acid and ammonia resulted in a foreign exchange savings of Rs. 40 crores. Therefore, the reimbursement of Rs. 850 per tonne demanded by phosphatic fertiliser units would have, far from increasing the subsidy burden, resulted in savings in subsidy as compared to what would have had to be paid in the event of continued production, it was argued.

The Union government argued that in the current year, the fertiliser industry does not have a case for asking for compensation. This is because of the rela-

tive price movements of phosphoric acid and DAP in the international markets.

By rough estimates, the foreign exchange savings by importing DAP instead of acid will not be much. In fact, C & F per tonne prices prevailing in the third week of October for DAP, phosphoric acid and ammonia were \$228, \$396 and \$174 respectively (ammonia is mixed with acid to produce DAP). According to these prices, the value of domestically made DAP works out to \$226.62 — about \$1.38 cheaper per tonne. But in the last month the relative price of acid has gone up faster than DAP prices, making DAP imports cheaper. But in any case, the differential of Rs. 1,300 will be considerably narrowed.

Thus, there is no question of substantial foreign exchange savings, or savings in subsidy that could be reimbursed to the affected phosphoric acid units. Then again, in the context of the severe foreign exchange crunch, savings in hard currency, however small, is worthwhile. The fertiliser industry has argued that there is "real and social costs" involved in keeping domestic plants closed, and unless the foreign exchange savings is not of a high order, the government should import phosphoric acid and ammonia and not DAP. Under the present circumstances, there is at least a strong case of compensation of last year's losses.

In all, the total requirement for phosphoric acid for the entire year is to the tune of 16 million tonnes. Against this, only nine lakh tonnes have been imported. Domestic units have already started closing down, and they are likely to remain shut till the end of the current financial year. The affected units are the Kandla unit of IFFCO, the Goa plant of Zuari Agro, the Madras plant of MFL, the Sikka unit of GSFC, Hin-

dustan Lever's Haldia outfit, Para Phosphate's plant at Paradeep, MC Mangalore plant and the Tuticorin Alwaye plants of SPIC and FAC.

CAMPBOR PRICES SHOOT UP IN BOMBAY

The price of camphor has recorded a sharp rise in the Bombay market during the last three weeks, following irregular supplies of stock from the manufacturers. As the prevailing price of camphor in Bombay market is at such a lucrative level that the traders from other states are attracted to despatch the stock to the Bombay market to sell at higher prices.

According to tabletiers, the shortage of camphor powder, at present, has put them in hardship as the camphor powder is the basic raw material for their factories to make the tablets of camphor from it. The tabletiers allege that they are compelled to buy the camphor powder from the local market with a premium of Rs. 5 per kg because of non-supply of their regular orders by manufacturers. They have already placed an order for the stock in the beginning of November which unfortunately has not been supplied so far by a leading camphor powder manufacturer. In the local market, the camphor powder of C.A.P. is sold at Rs. 110 per kg against its official selling price of Rs. 105 a kg.

According to the information available, camphor powder from other states, particularly from Delhi is frequently offloaded in the Bombay market on a large scale, which is possible because of vast variation of taxes between states. Of course, the packing of goods coming from the other states is quite different from the goods supplied locally by the same company. According to the tabletiers, they are not receiving supply of camphor powder on a regular basis from the manufacturer but on the contrary, they have to pay a large amount against the delivery order without any credit facility.

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Industries should make public, information on likely hazards

Managements of chemical and allied industries should not shun the media or voluntary agencies in making public, information about various hazards likely to occur in the industries, the Tamil Nadu governor, Mr. Surjit Singh Barnala said on December 10. Inaugurating a five-day international workshop on "hazard assessment and disaster mitigation in petroleum and chemical process industries" at the Central Leather Research Institute (CLRI), Madras, he said it was the industry's bounden duty to provide such information to society at large.

He said this was not to create a "panic situation" but rather to avoid one during emergencies. Referring to the 1984 Bhopal gas tragedy, the governor said the confusion about what the gas was and whether it was toxic had inhibited the search for an antidote. "When some doctors proposed sodium thiosulphate, the doctors of Union Carbide advised against it", he said.

Mr. Barnala said though ICMR studies in 1985 had concluded that MIC gas exposure lead to cyanide poisoning, Union Carbide held that MIC could not enter the blood-stream and could at the most cause varying degrees of local injury. Mr. Barnala expressed regret at reports that the company, even after the disaster, did not give vital information regarding the thermal decomposition of MIC or the identity of the components of the toxic emission and antidotal treatment.

Had systematic and appropriate information been available, people's suffering could have been reduced, he said. Calling for more attention to training of employees in safety measures and inculcating in them a good management policy responsible to safety needs, Mr. Barnala said according to some experts, the Bhopal tragedy could have been averted if the management had ensured

that at least two of the five preventive devices were in perfect order.

It was reported that some of the systems in the company were in bad repair and that when the pressure in the storage tank rose beyond the tolerable limit, the valve leading to the spare tanks was not opened, he said. Referring to the R.K. Garg committee appointed soon after Bhopal by the Maharashtra Pollution Control Board, Mr. Barnala said it had noted that some operators present in the plant's shopfloor "were not conversant with safety devices and procedures for handling abnormal operational problems".

Safety rules had been provided by the government, but there was a need to train and equip enforcement authorities. The Commonwealth Science Council (CSC) secretary, Mr. G. Thyagarajan, said CSC's industrial support programme had established an initiative that incorporates new knowledge and technology applications to enhance operability and productivity of industrial processes.

Presiding, the director general of the Council for Scientific and Industrial Research (CSIR), Dr. A.B. Mitra, said the inter-laboratory thrust within CSIR in the area of disaster mitigation had started in a big way after the Bhopal tragedy. A major weakness was the non-availability of a good data base. Building one should be the first priority. Dr. V.C. Pinnagoda from the International Labour Organisation, Geneva, which has sponsored 15 international participants for the workshop, said the proposed tripartite international legislation by June 1992 would further enhance global efforts at prevention of global accidents.

Mr. Malhotra said each year 1,000 to 2,000 new chemicals entered the market, adding to the 70,000 to 80,000

already existing. Many of these entered without adequate evaluation of their effects, he said, adding that in the developed countries, it was no wonder the demand for "greening of industry" was targetted on chemical industry.

Developing countries in particular were likely to suffer "serious effects" from any disaster as they had "limited capacity" to evaluate the environmental impact of imported products, he said and called for an international system to control trade in dangerous chemicals and chemical wastes. If developing countries were to avoid repeating the industrialised countries' mistakes and "leapfrog" to sustainable industrial development, the former need access to 'clean' technologies, he added.

A CSC manual and guide book on "methodologies for risk and safety assessment in chemical process industries", written by Dr. K.V. Raghavan, deputy director, Central Leather Research Institute, Madras, and Mr. A.A. Khan of the Indian Institute of Chemical Technology (IICT), Hyderabad, was released on the occasion by Dr. S. Varadarajan, former chief consultant, Planning Commission.

Speaking to the press about the workshop Dr. G. Thyagarajan, secretary, CSC, said that India was emerging as a leader in the field of risk analysis. The spurt in development in this field came after the Bhopal disaster, he said, adding that now Indian companies were very much alive to the question of industrial safety, and public awareness too was high.

The subject that will be discussed in the 11 technical sessions of the workshop are: Hazardous chemical reactions, consequences of thermal and explosion hazards, analysis of thermal initiated cascade or domino effects, hazards of toxic gases and their impact on environment, hazard and operability studies and their application in chemical plants, risk assessment of chemical plants and

more installations, hazard warning control and disaster mitigation and emergency preparedness and management. The workshop will also have, in addition, popular talks for the benefit of general audience. An orientation course has been held for four days in preparation for this workshop to provide opportunity to the participants to familiarise themselves with the conventional techniques of hazard assessment and disaster mitigation. Speaking of the expertise within the CLRI, or risk analysis, Dr. R.B. Mitra, director of the Institute said that CLRI's cell for industrial safety and risk assessment (CISRA) had an excellent track record in assessing ongoing risks and also in making safety an intrinsic factor in projects that are being planned.

The CISRA has conducted maximum accident analysis studies for a number of petrochemical and hazardous chemical industries like ONGC, IPCL, and the entire industrial area near Vadodras. Issues identified for the international workshop are the environmental impact of chemical accidents, international trends in safety, national and fiscal policy issues in planning of new industries.

SHORTAGE OF LIFE-SAVING DRUGS FEARED

All banks' insistence on depositing 10 per cent margin money for opening letters of credit will lead to a shortage of life-saving drugs, it is feared. Drugs and pharmaceuticals have been exempted in the Reserve Bank directive on margin money. However, bank officials are not sure about what items come under this definition. As per the government's definition, both bulk drugs and pharmaceutical formulations come under the definition of "drugs and pharmaceuticals".

However intermediates used in the manufacture of bulk drugs are not classified as drugs or pharmaceuticals. In the absence of classifications, some

banks are also not exempting bulk drugs. Though India is almost self-sufficient in most bulk drugs, vital intermediates are still being imported. The import content in bulk drug production is estimated at more than 40%. Most units stock two to three months inventory. This necessitates an increase in working capital requirements to the tune of 150 per cent (calculating margin money for three months imports).

CAUSTIC SODA INDUSTRY HAILS CHANGE IN EXCISE DUTY NORMS

The Union government has changed the norms for levying excise duty on caustic soda lye from 15 per cent ad valorem to Rs. 1,300 per tonne. At present there is an additional specific duty of 5 per cent on all grades of caustic soda. Thus, the total duty element would now amount to Rs. 1,365 per tonne as against Rs. 1,339 previously. The manufacturers of caustic soda have

generally welcomed the change. This is in spite of the fact that the net incidence of duty will be higher by Rs. 26/tonne.

It will be preferable to pay the same, according to the manufacturers, as it would reduce the paper work and would also mean less number of disputes with the excise department. Caustic soda is manufactured in lye, solid and flake forms. Production of all these grades during 1989-90 was 9.54 lakh tonnes.

However, the lye form accounts for the bulk i.e. 80 per cent, of production. Flake and solid varieties are manufactured by further processing the lye variety. Hence, their cost of production and consequently the market price are higher than the lye variety. The solid and flake varieties are currently quoted around Rs. 10,000 to 11,000 per tonne. The excise duty on flake and solid varieties was already changed to Rs. 1,300 per tonne in March this year. Thus, all varieties are now charged a uniform duty.

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CFBP award for Ashok Organics

At an impressive ceremony at the prestigious Durbar Hall of Rajbhavan on Monday, the 3rd December, Hon'ble Shri C. Subramaniam, Governor of Maharashtra presented the Council of Fair Business Practices (CFBP) Award for Medium Scale Manufacturers to M/s. Ashok Organic Industries Limited. Shri Ashok M. Kadakia, chairman and managing director received the award on behalf of the company. Dr. Anil M. Kadakia, joint managing director and Shri Pankaj M. Kadakia, joint managing director were also present at the occasion.

The following is the citation awarded to Ashok Organic Industries Ltd.

"Established in 1975 as manufacturers of alcohol and alcohol-based products, such as acetic acid, acetic anhydride, glycine, paracetamol etc. all used by numerous industries. The annual production is Rs. 25 crores. They believe in quality, safety, reasonable prices and prompt attention and service to their customers. Every year, they plan interactions with the customers. Their project division has successfully completed construction of four major plants and now the fifth project is nearing completion. As a part of their social commitment, they have started a

Student's Hostel at Devgad Baria for Adivasis (scheduled tribes) and economically backward students. An Arts & Commerce College was started in 1988."

Other award winners included M/s. Glaxo India Limited (Manufacturers-large), M/s. Sharp Industries, Coimbatore (Manufacturers-small), M/s. Shanghvi Modi & Co., Bombay (Traders, medium), M/s. A.K. Rai & Co., Jabalpur (Traders, small), and the Bombay Sugar Merchants Association Ltd., Bombay (Association).

Glaxo honoured among large manufacturers

Glaxo India Limited, were honoured for their strong commitment to the invention, development, manufacture and marketing of safe, effective medicines of the highest quality. The citation read out in their honour, read (in part) "The main thrust in support of the cause of the consumer has been to educate him and enhance his awareness. They have a commitment to the health-care business and to quality and safety of their products and operations. They aim at providing satisfaction to their customers, a continual reasonable return to their shareholders and a fulfilling job-security and secured future to their employees.

They recognise their duty to contribute towards the goal of improving national health. They have taken effective steps to discharge their social responsibilities by helping weaker sections and the handicapped, thus contributing to the community welfare."

About the council

The Council for Fair Business Practices was launched as a movement on 2nd October 1966, on the birth anniversary of the Father of the Nation, Mahatma Gandhi. It propounded the responsibilities and obligations of industry and trade to the consumer, and tried to build bridges of understanding between manufacturers and users. The main objective was to implement self-regulatory measures for the business community coupled with the aim of codifying the existing fair trade practices and setting up an effective machinery for their implementation in an organised manner in order to create greater goodwill and public confidence in the business community.

Code of fair business practices

Every member of the Council accepted the following fundamental obligations:

1. To charge fair and reasonable prices and take every possible step to ensure that the prices to be charged to the consumer are brought to his notice.
2. To take every possible step to ensure that the agents or dealers appointed by him do not charge prices higher than fixed.
3. In times of scarcity, not to withhold or suppress stocks of goods with a view to hoarding and/or profiteering.
4. Not to produce or trade in spurious goods or goods of standards lower than specified.
5. Not to adulterate goods supplied.
6. Not to publish misleading advertisements.
7. To invoice goods exported or imported at their correct prices.
8. To maintain accuracy in weights and measures of goods offered for sale.
9. Not to deal knowingly in smuggled goods.



Shri Ashok M. Kadakia receiving the CFBP Award

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Industrial alcohol decontrol sought

The All-India Distillers' Association (AIDA) has approached the Industry Ministry once again with a proposal to decontrol molasses and industrial alcohol. Sugar mills and distilleries are pushing the proposal on the ground that the country has and will have a net surplus of both molasses and industrial alcohol and price realisations for the sugar mills and distilleries are very low.

Currently, price and distribution controls exist on both molasses and industrial alcohol although both these controls are not enforced efficiently by some state governments. The argument of AIDA is that price realisation from the chemical industry is very low as sugar mills and distilleries are supposed to sell the molasses and alcohol at prices fixed by the Bureau of Industrial Costs and Prices.

Export realisations can be quite attractive both for distilleries and for the

government in the context of the current foreign exchange crisis. In fact, there is a worldwide shortage of both molasses and alcohol and prices have firmed up. Sugar industry circles feel that there will be an exportable surplus of 5 lakh tonnes to 10 lakh tonnes of molasses every year from now judging by the current uptrend in sugar production.

The price of molasses in the international market is almost seven times as high as the price fixed by the government — Rs. 120 per tonne. The alcohol-based chemical industry fears that in case of total decontrol of molasses and industrial alcohol, most of these chemical units would be forced to close down as there would be large-scale export and diversion to the potable sector.

As it is, chemical units in alcohol-deficit states like Gujarat, Karnataka, Andhra Pradesh, etc. are not getting the

required supplies of molasses and alcohol. As a matter of fact, a number of alcohol-based chemical units are working below 50 per cent of their installed capacity in these states.

Inter-state movement of alcohol, meanwhile, has come to a virtual standstill in the country with the imposition of various state levies by the two sugar states — Uttar Pradesh and Maharashtra — on alcohol purchases by chemical units of other states. Industry sources at Bombay point out that Uttar Pradesh will have at least 600 lakh litres of surplus while Maharashtra will have 200 lakh litres in the current season.

And if the four new chemical units come up as planned this year, there will hardly be any surplus in Maharashtra this year. A total decontrol would mean that the state governments will have no authority to allocate the available alcohol between chemical and potable sectors. And it is possible that the production of alcohol may be diverted to the potable sector, the chemical industries fear.

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AIDS VACCINE TO BE TESTED IN THIRD WORLD

Though AIDS kills more people in the west, people in developing countries will be used for the first large-scale human trial of AIDS vaccine, now being developed in the west, as soon as it is ready. The WHO had announced in early 1991, that its teams will conduct potential vaccine field trials in selected developing countries. The organization's press release said that at least three sites will be selected during the year. After that, WHO will send equipment and supplies to the selected developing countries and provide training to local scientists for conducting the trials. WHO said that the decision to identify suitable developing countries for the vaccine trial was taken at a November meeting in Geneva at which specialists from industrialised and developing countries were present.

Detergent manufacturers urge tax concessions

The Small Scale Detergent and Soap Manufacturers Association has made a plea to the West Bengal State Government to modify the sales tax to make the detergent industry competitive with those units in the rest of the country, and particularly in Maharashtra and Gujarat.

During the Annual General Meeting of the Association held on Wednesday, the 5th Dec., 1990, at Calcutta, Dr. Bikram Sarkar, Commissioner, Secretary, Commerce & Industry, Government of West Bengal, in his speech said that the small scale detergent industry of West Bengal will get all the necessary support to revive this industry from its present insignificant status. Regarding Haldia Petrochemicals, Dr. Sarkar said that they are seriously thinking to introduce some of the down-

stream chemicals for the benefit of the small scale industry of West Bengal.

Shri A. Ray, Director, Small Industries Service Institute, Government of India, Calcutta, expressed his all out support for the small scale detergent industry of West Bengal. He also said that his institute could help in exporting detergent powder manufactured by the small scale industry.

Shri A. Sen, Managing Director, West Bengal Small Industries Corporation, in his observation, said that the small scale detergent industry of West Bengal is handicapped compared to their counterparts of Western India on many counts, therefore they deserve help and support from the State Government.

Shri C.R. De, Regional Manager,

National Small Industries Corporation, informed the gathering that the NSIC has been trying to market detergent powder under a common brand name through the Public Distribution System.

Earlier, in his presidential address, Shri Dipak Kumar Mitra, President, The Small Scale Soaps and Detergents Manufacturers Association, painted a grim scenario of the detergent industry in the Eastern region. The following is the text of his address:

"Respected Dr. Bikram Sarkar, Shri Achyut Ray, distinguished guests and friends,

On behalf of the Small Scale Detergents & Soaps Manufacturers Association and on my own, I have immense pleasure to welcome you all to this Annual General Meeting of the Association which is the apex body of the small scale detergents and soaps manufacturers in the eastern region of the country.

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It is indeed a proud privilege and honour for us to have Dr. Bikram Sarkar, Commerce & Industries Secretary of West Bengal Government amongst us on the occasion of the Annual General Meeting of the Association. Dr. Sarkar is known as an administrator of dynamism, dedicated to the cause of industrial development in West Bengal. He is the key-figure behind the speedy implementation of the Haldia Petrochemical project. Time and again the industry has taken the shelter of Dr. Sarkar and he always extended his helping hands to solve the just problems of the industry with positive results. And on this ground the small scale detergent industry in West Bengal will not be denied of his blessings to solve its chronic problems.

Shri Achyut Ray, has recently taken over as the Director of the Small Industries Service Institute of the Government of India as the able successor of our beloved, Shri N.K. Guha. But by

this time Shri Ray has proved his keen interest in the multiple problems of the small scale industry by conducting dialogue with various sectors of the small scale industry to identify its basic problems. We wish him all success in this venture.

We are meeting at a time when the industrial scenario of West Bengal as also of the whole country is passing through a crucial period. To overcome this our beloved Chief Minister Shri Jyoti Basu as well as the new Prime Minister have taken several remedial measures to revive the industrial health of the country. We, the people in the small scale industry earnestly hope that there will be greater interaction between the Government and the industry, especially the small scale industry to achieve the common goal in bringing back West Bengal to its pride position as one of the leading industrial states of the country. Please allow me to turn to the detergent industry which is the vital sector

of consumer goods industry in the country and now stands at the cross-r

As far back as in 1957-58, synthetic detergent was first introduced in the country with a modest production of only 57 tonnes produced by a few small units. Soon the fabric washing market of the country underwent a revolutionary change and the use of detergents gradually became popular. Its pick-up was so speedy that by the beginning of 1970, the total annual production of the detergent industry went up to 70,000 tonnes and by 1985-86 production touched 6.25 lakh tonnes. Today this industry is considered to be one of the fastest growing industries in India and it is estimated by the working group on oils, soaps and detergents in the Seventh Five Year Plan that the demand for detergents would touch 11.13 lakh tonnes by the end of 1990 and would contribute 50 per cent of the total market of washing materials. F

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re, the Planning Commission indicates that the total demand for detergents in the country would rise to 25.5 lakh tonnes by the year 1990 and would contribute 60 per cent to the total washing material market. The Eastern Region of the country alone is estimated to contribute around 16 per cent of the all India market for detergents which was roughly 1.0 lakh tonnes in 1985-86. It is estimated that by the end of this decade the demand for detergents in the Eastern Region would be of the tune of 1.78 lakh tonnes and by the year 2000 AD, this would increase to 4.08 lakh tonnes.

Significantly, the small scale sector is contributing approximately 70 per cent of the total detergent production in the country. It is interesting to note that the overall 20 per cent annual growth during the last Five Year Plan, the small scale sector of the detergent industry has achieved an average growth of 28 per cent against the growth of 13 per cent by the organised sector.

Unfortunately, while there has been tremendous growth of the detergent industry on all India basis, there has been a virtually stagnant growth of this industry in the Eastern Region of the country, particularly in West Bengal due to various problems and constraints. Most of the small scale detergent and manufacturing units in West Bengal are heading towards sickness and are almost on the verge of extinction.

This dismal picture of the Eastern Region does not match with the national growth of 20 per cent in the detergent industry which comprises of 13 per cent growth in the organised sector and 28 per cent in the small scale sector. As a matter of fact, the production of the organised sector of the industry in the Eastern region of the country was only around 30,000 tonnes in 1985-86 and the small scale sector mainly concentrated in West Bengal produced hardly 10,000 tonnes of detergents. The gap between demand and production in this

part of the country during 1985-86 stood at 60,000 tonnes and is likely to shoot up to around 1.2 lakh tonnes by 1990. This shortfall is being met mainly by the small scale detergent units of Gujarat and Maharashtra.

Recently prices of basic raw materials required for production of detergents have been increased exorbitantly but with free availability in the markets, and this is just the right time to give the small scale detergent industry in West Bengal the boost that it rightly deserves to make it in line with our counterparts in Gujarat who enjoy immense advantages like:

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- Lower sales tax on finished product, i.e. CST @ 1% as against the normal 4%, and local sales tax @ 6.5% as against West Bengal sales tax of 8%.

In a series of memorandums to the Government for the last couple of years the Association has shown that the cost of standard washing powder produced in West Bengal when sold in the Eastern Region of the country is around 0.80 paise per kg higher as compared to the washing powder produced in Gujarat, on account of the various benefits that are being enjoyed by the small scale units in Gujarat. This calculation is prior to the recent hike in basic inputs. The revival of the small scale detergent industry in the Eastern Region of the country as a whole and West Bengal in particular has been discussed at various forums and seminars in the past and we reiterate that to counteract the immense advantages which are being enjoyed by the small scale units in Gujarat, it is high time for the Government of West Bengal to allow some concessions to the ailing small scale units in West Bengal in the form of: concessional sales tax tariff or to treat the industry at par with the small scale soaps industry which is

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exempted from paying the West Bengal sales tax; and subsidy in basic inputs, since recently, these have been increased exorbitantly due to oil crisis in the Gulf.

If these concessions are given to the small scale detergent units in West Bengal, ultimately it would not result in any revenue losses to the exchequer, since the present production tonnage of the small scale detergent units in West Bengal is negligibly poor as compared to the possible tonnage that can be achieved, whereby the revenue on account of the sales tax levied on the raw materials inputs @2 per cent and octroi duty @2 per cent together, would be much higher as against the revenue earned by the State Government presently on account of 8 per cent local sales tax on detergents. Incidentally, I may mention that the Government of Gujarat, for the purpose of boosting the industry in that state, has given further concession to the small scale detergent

industry since the middle of 1987 in the form of 1 per cent Central sales tax, on their sales outside the state. Here in West Bengal, we have to pay 4 per cent Central sales tax. This is a single instance as to why small scale detergent units do not get their market even in West Bengal in comparison to the products of the small scale detergent units of Gujarat. For Gujarat, West Bengal and rest of the Eastern Region have become a dumping ground.

In several occasions the Association has appealed to the Government that the detergent products of the small scale units in West Bengal should be marketed through the Public Distribution System. The products would conform to the appropriate quality standards. This would, at the same time, enable the common man both in the rural and urban areas to get a quality product at reasonable prices.

National Small Industries Corpora-

tion Limited, an organ of the Government of India, volunteered to form a consortium of the members of the Association and market detergent products under a common brand name. Chairman of the NSIC, Shri S. Juneja, has taken special initiation to implement this project. We hope that in the long run NSIC will solve the acute marketing problem of the small scale detergent units of West Bengal.

In view of the fact that several letters of intents have been issued for setting up of linear alkyl benzene plants including one to Hindustan Lever Limited, the said plants should be set up at Haldia to meet the requirements of the Eastern Region.

Immediate actions should be taken to produce soda ash, a basic raw material for detergent products, at the Hindustan Fertiliser plant at Haldia to meet the region's requirements. Ethylene oxide is a raw material for the production

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non-ionics should be identified as one of the downstream products of the Haldia Petrochemicals project, to boost up the industrial development and growth of this region.

The West Bengal Small Industries Corporation Limited has all along stretched its helping hands to the small detergent units in the State in various forms like allotment of lands, raw materials like palm fatty acid, under its most able and sympathetic managing director, Shri Ardhendu Sen. He has been trying his best to get allotment of trisodium phosphate, a scarce raw material, from the Indian Rare Earths Limited, for distribution on fair-price to the small scale detergent manufacturing units. Shri Sen may kindly take positive steps promptly so that more needy units might be provided with lands/sheds in outskirts of the city for setting up new units or shifting the existing ones.

Whereas everyone present here today

keenly look forward to restoration of the lost industrial glory of West Bengal, I sincerely hope that the problems and constraints of the small scale detergent industry here would receive due attention by high Government officials like Dr. Bikram Sarkar, Shri Achyut Ray and others. They have all along supported the just causes of the industry and I appeal to them that the time is ripe for revival of this ailing industry. Further delay in taking remedial steps by the West Bengal Government to the problems of this industry will only remove the name of this State as one of the contributors of important consumer items like detergents. Consequently the exchequer will lose its revenue and unemployment problem will increase.

I am grateful to Dr. Bikram Sarkar for graciously accepting our invitation to inaugurate our Annual Session and having taken great interest in this particular industry. I assure you Sir, that given the right support, the members of

the Association would prove beyond doubt that the Small Scale Detergent Industry in West Bengal is capable of producing incredible results a second to none in this sub-continent. I am also thankful to Shri Achyut Ray, Director, Small Industries Service Institute, Government of India, honours and guests, members of the media and members of the Association for their pains to grace our Annual Session and giving me a patient hearing.

Before I conclude, I shall be faithful in my duty, if I do not express my heartfelt thanks to all my colleagues in the Committee of the Association in particular the members of the Association for a whole for their unstinted support and wholehearted cooperation with which I could not discharge my fiduciary duty so smoothly during my tenure. I also place on record my appreciation for the Secretariat of the Association which readily responded to the call of the hours with high efficiency and positive result."

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A unique export-oriented unit is being set up at Sinnar, Nashik district, Maharashtra. It will import polyacrylic scrap from United States and reproduce the material for export back to America. The new unit is being promoted by Avikem Resins Ltd., a company manufacturing industrial resins and adhesives. The EOU will be a joint venture with Alaric Inc. of U.S. to manufacture 6,000 tonnes per year of regenerated methyl methacrylate monomer (popularly called acrylics).

Alaric is a leader in recycling acrylic wastes. According to Mr. Vinay Govil, chairman and managing director of Avikem, Alaric has over the years developed knowhow for recycling acrylic scrap (called Alaric's process) to regenerate virgin grade MMA monomer to obtain the maximum possible yield. This will be the first project of its kind in India.

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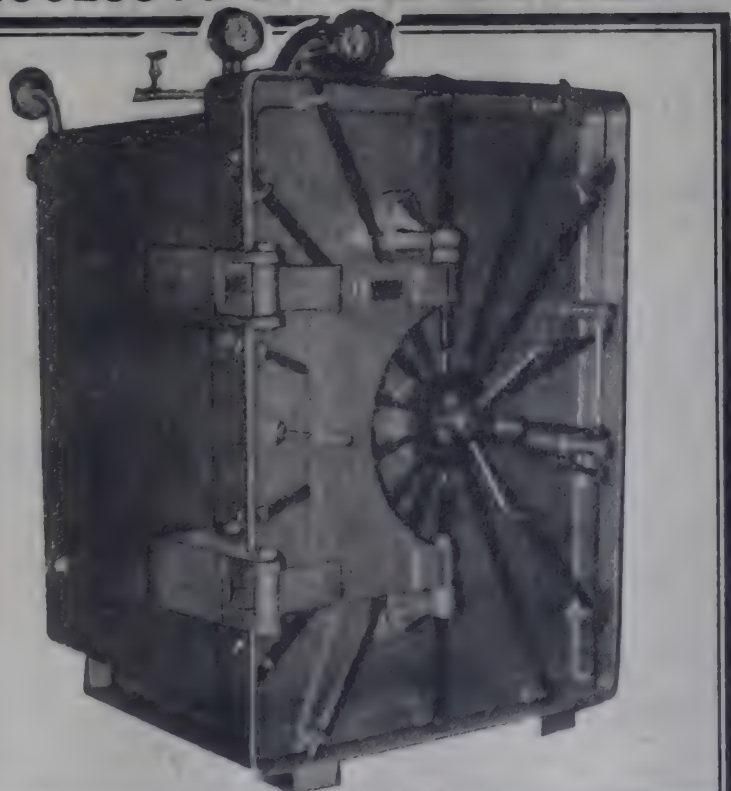
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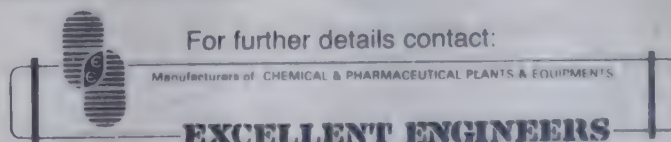
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Plastics panel mooted

view of the likely growth of the plastic industry, which is poised to grow ten folds in the near future, a Plastic Commission on the pattern of the Electronics Commissions has become a necessity. Experts have underlined the need for urgently constituting a Plastic Commission to coordinate the growth of this industry, which is employment-intensive and offers great export potential. The Plastic Commission, it is felt, will study the technologies available abroad and help the Indian industry to select appropriate ones. In the wake of rapid socio-economic changes taking place, the demand for plastic products is rising by the consumer as well as the processor sectors are likely to grow at a much faster rate.

As far as the growth of the plastic industry is concerned, the number of processing units have risen from 6,500 in 1980 to more than 13,500 in 1990 and it is expected that by the turn of the century the number of such units would rise to around 22,000. The investment in the processing industry is of the tune of Rs. 325 million, which is expected to increase by 125 per cent by 2000 AD. The processing industry at present has a capacity of more than 1,50,000 tonnes of material, which is expected to increase by 200 per cent by the turn of the century. The industry is also employment-intensive and is likely to provide employment to around 20 lakh persons by 2000 AD. More significantly, the set-up of petro-chemical complexes would result in proliferation of the plastic processing industry in every nook and corner of the country.

Such a step will not only help in technological upgradation and increase in exports of finished products, but will also help the Indian plastic industry to hold its own to the fastchanging industrial environment. The plastic industry is especially important in the Indian context, because it has the potential for replacing scarce metals, wood, leather and a number of other items.

The plastic industry in the country, which started with simple technology for manufacturing household items is now making high precision items. The industry is also producing a variety of items like furniture, electronics, telecommunications electric cables, medical care items, processing and packaging, footwear, agriculture implements and pipes for distribution of potable water and irrigation purposes.

The plastic industry has also contributed to the success of the 'green revolution' in its own way by manufacturing products for canal lining, water sprinkler systems etc. The plastic industry has also done well on the export front. The export went up from Rs. 47.94 crores in 1980-81 to Rs. 74 crores in 1985-86. The exports are expected to be around Rs. 150 crores by the end of the Plan. It is also estimated that with the development in technologies and qualitative change in the end use, the industry will record a growth rate of 12 per cent during the Eighth Plan period. Also the growth of plastic footwears will help in increasing leather goods exports, indirectly adding to country's total exports.

Realising the importance of this industry, the Government has accorded it the status of 'sun rise industry'. However, the experts feel that this alone is not enough. The industry requires a congenial atmosphere coupled with favourable policies for its vertical and horizontal growth. It is felt that the electronics industry got a boost by way of significant policy support. However, the same did not happen with the plastic industry. In this regard, the experts argue that a Plastic Commission could be of great help by way of giving a proper direction to the industry.

COMPETITION BETWEEN JUTE, SYNTHETICS GROWING: FAO

With the full impact of the Gulf crisis yet to be felt, competition between jute

and synthetics has increased in recent times. This was the conclusion of a session of the UN Organisation viz. the Food and Agriculture Organisation (FAO) held recently in Rome. According to the chairman of the 26th inter-governmental session of FAO, Mr. R.N. De, global capacity for producing polypropylene (PP), one of the key inputs for producing synthetic goods, would increase by 19 million tonnes by 1982.

This would mean a 14 per cent growth rate for PP between 1988 and 1992, Mr. De said, adding that most of the planned increase in capacity was expected to be in the Gulf region. Mr. De, who is the jute commissioner, said that while global production of jute rose to 202 lakh bales in end July 1990, (the jute season ends in July) as against 172 lakh bales in the previous season, world import of jute goods fell by three per cent with the West Asian countries accounting for a major decline.

While emphasising the possibility of increasing competition in the very near future Mr. De said the session noted that the impact of the Gulf crisis was yet to be felt on the intermediate petrochemical products, as there was some inherent time-lag.

He said that import of jute fibre increased by 20 per cent with Bangladesh accounting for 80 per cent of the imports.

In view of the immediate threat from synthetics, there was an urgent need to promote diversified jute goods on one hand and on the other, highlight at every possible forum the environment superiority of natural fibres over synthetics.

According to a West Germany-based organisation: Environment Protection Encouragement Agency which was appointed by FAO, jute stood out vis-a-vis other synthetic materials as being far less damaging to the environment during the respective life cycles of these two materials.

SHIFTING OF INTERMEDIATES TO RESTRICTED LIST PVC manufacturers in a quandary

Vinyl chloride monomer (VCM) and ethylene dichloride (EDC), intermediates for making PVC, have been shifted to the restricted list of the import-export policy. This has created a quixotic situation whereby the government encourages the import of the finished product (PVC, which continues to be on the OGL list) and discourages the import of intermediates by local PVC producers.

The move is the result of the government's decision to shift items falling in the residual list (those not specifically listed in Appendix 6 list 8 part I and II) to Appendix 3-A with a view to curb foreign exchange outgo.

According to industry sources, there is a difference of \$250-300 per tonne in the foreign exchange outgo on the two intermediates and PVC. The production of PVC by DCW Ltd. is based entirely on imported VCM. To make up the shortfall in the availability of alcohol and chlorine, Chemplast Ltd. of Madras also imports EDC and VCM to supplement its own production of these intermediates.

Even National Organic Chemical Industries Limited (NOCIL) and Indian Petrochemicals Corporation Limited

(IPCL) occasionally import EDC depending on indigenous availability of ethylene and chlorine. About 50,000 tonnes of PVC per annum is indigenously produced from imported EDC/VCM out of a total production of 1,30,000 tonnes a year.

The current demand for PVC is about 2.5 lakh tonnes. The gap of about 1.2 lakh tonnes between indigenous production of 1.3 lakh tonnes and the demand of 2.5 lakh tonnes is met by imports.

Imports are not only under OGL for actual users but also allowed for stock and sale. On a production of 50,000 tonnes of PVC from imported EDC/VCM, there is a net foreign exchange saving of about Rs. 25 crores a year.

There is no indigenous EDC or VCM available for sale as all EDC and VCM produced is captively consumed by polyvinyl chloride manufacturers. In order to increase indigenous availability of PVC and to make up for the shortfall in the availability of ethylene and chlorine (due to power cuts), import of the two intermediates under OGL was recommended by experts like D.V. Kapur.

Imports of the two intermediates now force manufacturers to apply for import licence. Apart from the some licensing procedures, the process is complicated because the two intermediates are not available off the shelf for advance planning of two to three months besides specialised oil tankers, vessels and port facilities. Stockpiles are also limited.

The PVC resin manufacturers have urged the government to expedite the clearance of applications for import licences so that units do not shut down. At the same time, it has urged the government to shift the two intermediates to the OGL list as long as PVC remains on the OGL list.

Associations representing the PVC manufacturing industry too have backed the government proposal. The producers' body has requested the government to provide exporters' credit on imports with a view to help the government tide over the immediate problem of foreign exchange squeeze.

The government's decision to shift the import of EDC/VCM may also affect the prospects of Reliance Petrochemicals and Finolex, both of which are planning to set up polyvinyl chloride plants based initially on imported stock.

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Hyundai all set to bag Panna project

Korean giant, Hyundai Heavy Industries (HHI), is all set to bag the oilfield development project. The Petroleum Ministry which opened the tender on Dec. 3, found the Koreans offering a very attractive amount of just \$80 million for the process platform complex. HHI is the only bidder for the project. The bid has been sent to the steering committee of the Oil and Natural Gas Commission (ONGC).

The development of the Panna oilfield was cleared by the government in August this year with a total cost of Rs 149 crore. The project consists of two well platforms, one process complex, flow lines and drilling of 69 development wells. The tender for the project was initially floated three years ago in November, 1987. The bidders included TGP of France, MDL (India) and HHI. HHI was then considered as technically best and had also quoted the lowest price. The price quoted at that time was US \$250 million. However, orders were not placed on HHI due to a strike by the Korean company's yards and certain audit objections on an earlier order.

HHI subsequently increased the price by 10 per cent in September, 1989. On the eve of the elections, the then Congress (I) government decided to refloat the tender. The official retendering was

notified in February. In May, 1990 only one bid was received, from HHI. The Japanese who also take a keen interest in oil projects stayed away following the Indian government's decision to blacklist them due to the alleged kickbacks given by a Japanese firm to an Indian businessman in some other deal.

Official sources find it surprising that the Koreans have quoted just about \$30 million more than they had quoted about three years back and \$5 million more than the last year. The bid is extremely attractive and there is little doubt that the ONGC will let the opportunity slip, unless of course the Neelam oilfield story is repeated. In the case of the Neelam project, the HHI was again the only eligible bidder and their offer was valid till September 28.

The ONGC steering committee, however, met only on September 26, just two days before the expiry of the validity date. The very next day ONGC did call the HHI officials for negotiations. However, HHI waited for two days and informed ONGC on October 1 that the prices have been increased by 15 per cent. In the case of Panna, the HHI offer is valid only till December 18. A final decision has to be taken before this date, otherwise the Koreans will definitely increase the prices. Panna

is one of the three major oilfield development projects proposed to be executed in the Eighth Plan. The other two being the Mukta and Neelam oilfields. In these two oil fields as well, HHI has put in a bid. However, in Mukta, HHI is pitched against the Indian company, MDL and another Korean company, Dae Woo.

Panna oilfield has a peak production capability of two million tonnes per annum and three million cubic meters of gas per day. The corresponding figures for Mukta are 2.7 million and two million, respectively. The Neelam platform is designed to handle about six million tonnes of oil per year and 2.5 million cubic metres of gas per day.

EDC CREDIT TO OIL

Oil India Limited (OIL) and the Export Development Corporation (EDC) of the government of Canada have signed an agreement for an EDC line of credit of OIL amounting to US nine million dollars. This is pursuant to a three year old financial protocol between the government of India and the Canadian International Development Agency (CIDA). It will be coupled with a corresponding grant as US \$5.52 million from the CIDA to the Government of India, a press release said at New Delhi.

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OIL EXPLORATION

Call to involve foreign companies

Mr. Avijit Mazumdar, president of the Associated Chambers of Commerce & Industry of India (ASSOCHAM), has urged the Union government to involve foreign companies in a big way with the exploration and production programme as a first step towards raising oil production.

Commenting sharply on the dismal performance of the public sector oil companies despite huge investments, Mr. Mazumdar said the entry of foreign expertise should be able to reduce our dependence on imports and thus help tackle the critical balance of payments (BoP) situation. "Much of today's BoP crisis has been due to the huge oil import bill aggravated by poor domestic production", he observed.

Addressing newsmen at Calcutta at the end of two-day meetings of various ASSOCHAM committees, the president felt that particular attention should be paid to step up onshore activities which were much less costly to undertake vis-a-vis offshore. Although the oil crisis continued to hit the economy, very large areas of sedimentary basins, where prospects of hydrocarbon could be bright had not yet been tapped. Referring to government permission already

accorded to a few oil companies for undertaking exploration activities in certain blocks, he said only those blocks which were difficult to operate and where the hydrocarbon prospect was little had been identified by the nationalised oil producing companies for foreign participation. He emphasised the need for a total change in the government policy of oil exploration.

Mr. Mazumdar also expressed displeasure, against the induction of owner's relatives and associates with little managerial experience on the board of companies where some business houses held the majority stake. "As a professional manager, I am against such induction", he said and pointed out that precisely for the same reason he was opposed to induction of trade unionists on the board of the company. In a professionally managed company, an executive would have the entry into the board only after he had put in several years of service and thus acquired experience in handling management issues. When his attention was drawn to cases where even a professional manager would not have qualms to head the board of company full of such 'unprofessionals', he replied that the concerned professional was a mere

employee in such a company. ASSOCHAM president favoured the idea of taking help from the International Monetary Fund as a means to tide over the crisis, but conceded that the conditionalities would not be palatable.

"This is not to suggest that there should be any compromise on the country's sovereignty", he added that the difficulties for the period should help promote growth in a big way. BoP, apart from being a major problem facing the country, according to him, related to huge budget deficit, inflationary situation and change in government. The budget deficit, in his opinion, was due to the indecision on the part of policymakers and the absence of a real effort to curtail government expenditure. "The steps announced in the name of economy are only cosmetic touches", he observed and stressed the need for doing away with ad hocism in government policy in favour of an integrated long-term policy, though he was not sure if the frequent changes of governments at the top would really help work out such policies. "Perhaps we have not been prepared for an Italy-like situation with frequent changes in the government, but it should not affect the process of industrialisation", he said.

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S firm to formulate ONGC's global tenders

petroleum ministry has engaged services of the US-based consulting firm, Arthur D Little, to formulate and evaluate the fourth round of bids for oil exploration, expected to be floated shortly. The ministry will have to seek Cabinet approval before it floats the bids based on the US report. The deal with the foreign company assumes significance in view of the lukewarm response from foreign companies to the third round in 1986, when an internationally reputed company was expected to prepare a package which would be more acceptable to foreign investors. Sources say the Oil and Natural Gas Commission has already prepared the dockets containing details of the blocks proposed to be offered in the fourth round. As many as 71 blocks may be offered, of which 33 will be onshore and 38 in offshore areas. In the third round of bidding in 1986, only 27 onshore blocks were offered to foreign companies.

A better response to the fourth round is also anticipated since the Gulf crisis has rekindled interest in oil exploration all over the world. Economic viability of oil exploration has also improved as a result of higher international oil prices. Indications are that most of the terms

and conditions for the third round may be retained. These included a provision that the foreign oil companies share of oil discovered would be available to the govt. at international prices till India achieves self-sufficiency. Exploration was to be done at the foreign company's risk and cost, but if there was a commercial discovery, domestic oil companies could participate to the extent of 40 per cent in development and production. Besides, the domestic companies would be entitled to share output corresponding to their participation.

Other terms in the third bid included sharing of crude with the govt. on a sliding scale basis after the contractor recovered costs. The Indian govt.'s share would also increase as the project economics improved. The decision to offer more blocks has been taken in view of the need to accelerate oil exploration. Domestic production was not sufficient to meet rising demand, while imports were proving far too costly. Besides, production of other energy forms has not reached the desired levels.

PIPED GAS FOR SURAT FROM MID-'91

The Gujarat Gas Company is all set

to supply piped natural gas to Surat from the middle of next year with the underground pipeline laying work scheduled to be commissioned shortly. Final touches have been given to the pipeline laying work from Adajan area, where the company's gas pumping station will be located, to Bhestan, Rander Road, Nanpura, Athwa Lines and Majura Gate areas in the first phase.

The work is likely to be completed before the next monsoon. Two km of underground pipeline will be laid daily. All the technical personnel have been recruited and the requisite raw material acquired. The gas pumping station will start receiving its daily quota of natural gas from the Oil and Natural Gas Commission's Hazira plant by April 1991.

These details were provided by Mr. K.P. Sinha, project co-ordinator of the company at a meeting between the company officials and members of the regional infrastructure and coordination committee of the Southern Gujarat Chamber of Commerce and Industry held at Surat in the last week of Nov.

Mr. F.B. Virani, the managing director of the company, said the pipeline laying work has been so designed that it accommodates a further seven lakh cubic metres of natural gas.

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KANDLA-BHATINDA PIPELINE

EIL offers to execute project

Engineers India Ltd. (EIL) has offered to execute the Kandla-Bhatinda pipeline project on a turn-key basis. The offer has been made to Indian Oil Corporation (IOC) and is being considered by its board. EIL, which has also prepared the detailed project report (DPR) for IOC, has said that it has the necessary expertise to execute the project. The DPR was submitted to IOC about a month back.

If approved by the IOC board, it will be the first major project for EIL, which is famous for giving consultancy services. EIL is already thinking of setting up of a separate company which will execute major turn-key projects. The proposed company is likely to have a large capital base. The EIL board has approved in principle the idea of having a separate company for this specific purpose, sources point out. The gov-

ernment had approved IOC's proposal to set up the 1300-km pipeline in August. The clearance had come after a prolonged debate on the project. The ministries clashing over the project were the petroleum and petrochemicals ministry, railways and defence.

While the petroleum ministry wanted to set up the project, the railways and the defence ministries did not want the government to allow the project as it would erode the viability of the rail-line planned on the Kandla-Bhatinda sector. The net result was that the project got delayed though the battle ended in the petroleum ministry's favour. The delay resulted in cost escalation. According to a fresh DPR, the project will now cost more than Rs. 1,100 crores with the foreign exchange component exceeding Rs. 300 crores. The estimated cost in August was less than Rs. 1,000 crores,

which included a foreign exchange component of about Rs. 200 crores. The project, when it was conceived about three years ago, was estimated to cost only Rs. 600 crores. The project is estimated to be completed in four years. IOC has not taken a final decision on awarding the contract. It is learnt that participation of foreign companies in executing the project is also being considered. EIL has also conveyed that certain areas which were not possible for it to execute could be awarded to foreign companies. EIL also does not have any objections in joining hands with a foreign company to execute the project.

The pipeline will traverse Gujarat, Rajasthan, Haryana and Punjab with a 123-km branch pipeline from Kota to Jodhpur. It will enable uninterrupted supply of petroleum products to the north-west and Koyali-Kanda-Okhla region comprising Jammu and Kashmir, Punjab, Haryana, Himachal Pradesh, Delhi, Western U.P., Rajasthan, Madhya Pradesh and Gujarat.

BRITISH PETROLUM AGREES TO SUPPLY CRUDE

British Petroleum (BP), one of the international oil giants, has agreed in principle to supply crude to India on deferred payment. According to international oil industry circles, the top management of BP has given the green signal and the details of the proposed agreement are being worked out. Indications are that BP will provide credit for six months on a supply of one million tonne of crude per annum.

Malaysia too has agreed in principle to a similar arrangement but a confirmation in this regard from that country is still awaited. The decision of BP and Malaysia will provide some relief to the foreign exchange-starved Indian government for sometime. The Indian government has been desperately seeking credits to finance oil imports in its anxiety to postpone borrowing from the IMF.

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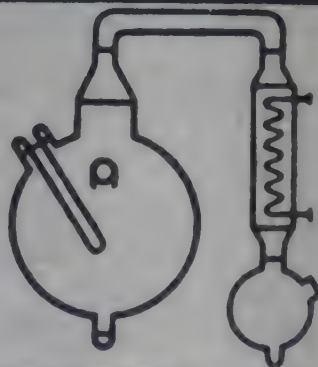
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ONGC's zero-gas flaring project cleared

Buckling under the World Bank pressure, the Public Investment Board (PIB) at a meeting on December 6, gave a green signal to Oil and Natural Gas Commission's (ONGC) zero gas flaring project, estimated to cost Rs. 3,500 crores.

With PIB giving nod to the project hanging fire for almost a year now, one of the two stumbling blocks in the way of ONGC to get World Bank assistance to meet the foreign exchange requirements totalling US \$1,350 million has been removed.

Because of the tight financial position, the Union Government has posed the projects to the World Bank. In response, a 12-member team had visited India in October this year.

The Bank is believed to have told the Government to first clear the project at its end and also lift ban on the parti-

cipation of two Japanese companies in global tenders to be floated for the project.

The Japanese companies were black-listed by the National Front Government for allegedly paying kick backs to some Indian businessmen in another ONGC contract.

The scheme envisages the development of L-II and III reservoirs at Bombay high. It was presented before a high-powered committee headed by the Expenditure secretary in August this year, but was not favourably considered.

It was pointed out that the South Bassein gas field and the creation of processing facilities at Hazira at a cost of about Rs. 1,500 crores were not giving adequate returns. At present just 50 per cent of the capacity of South Bassein is being utilised. In view of the resource crunch, the project was not considered

feasible. Later on, the scheme attracted the attention of the World Bank which had recently decided to lay greater emphasis on funding the gas development programme.

The proposal submitted to the World Bank for consideration includes the following components: (a) Expansion of facilities at Hazira terminal, (b) Bassein-Hazira pipeline, (c) SHG process platform (Bombay high-south) and other associated jobs (d) NOP process platform (Bombay high-north) along with associated jobs and (e) Pipeline from ICP platform in Bombay high-south to Heera field.

The L-II reservoir is mainly present in the northern part of the Bombay high structure. The development of L-II envisages the construction of five well platforms, drilling and completion of 4 wells, process platform 'NOP' interconnecting submarine pipeline and gas feeder line.

The reservoir simulation studies for this reservoir have estimated an additional production of 16.545 million tonnes of oil and about eight billion cubic metres of gas. In addition to this, the implementation of this project would help increase the utilisation of 2.69 billion cubic metres of gas over the entire life of the project.

The additional development of L-II which is also called the enhanced oil recovery project for Bombay high south envisages the development of L-II reservoir by drilling additional infill wells to improve recovery.

The reservoir simulation studies have indicated that it is possible to obtain an additional production of 40,004 MMTC of oil and 18 billion cubic metres of gas by in-fill drilling. The processing and other related facilities planned would also enable increasing to utilisation of gas to the extent of 36 billion cubic metres for the entire life of the project.

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H PRESSURE IN ONGC WELL

Engineers failed to respond to warning signals'

the damage that was inflicted on an exploratory oil well in the western off-shore region recently following the occurrence of abnormally high pressures, could have been averted if engineers had responded effectively to the warning signals they received, it is learnt.

Inquiries reveal that long before the drilling operations reached the high pressure zone, engineers of the Oil & Natural Gas Commission (ONGC) had encountered a "loss zone", where the drilling mud used to maintain the well pressure (and prevent the pressure from building upwards) began seeping into fractures on the well's sides because of loose rock formations. ONGC engineers managed to contain the mud loss by pumping in loss circulation material and maintained the pressure, but failed to cement the affected area. Cementing could have ensured that the mud loss in the affected area did not recur.

Up to a depth of 2,400 metres, casing shoes prevent the mud chemicals from coming in contact with any loss zones along the way. The "loss zone", however, was encountered at a further depth of 3,200 metres. Having temporarily contained the mud loss in the area, the

engineers continued drilling.

Some of the engineers present on the "Sagar Bhushan" drill ship positioned on the well, say that the primary error was the decision to continue drilling without cementing the loss zone. When the drilling operations reached the depth of 3,507 metres, the abnormally high pressures that were exerted upwards moved with such force that the temporary plugging of the loss zone gave way.

The gases and fluids within the well, pushed upwards by the pressure, reached the top of the well. At this stage, the engineers on board the drillship decided to divert the surging gas through pipes alongside the rig structure, right to the top, and release it from there. This plan, however, did not work, thanks to the pressure of the gas, combined with an equipment failure.

The "rams" or clamps, holding the well's blow-out preventer that is positioned on top of the well, failed to work, causing the pipe to burst, and letting the gas and fluids reach the surface. Immediately, a fire broke out on the surface as the gas came in contact with oxygen in the atmosphere, but was quickly con-

tained. This was done by shearing off the drill pipe with built-in equipment and simultaneously capping the well.

ONGC officials, however, maintain that there was no fire. Terming the encounters with high pressures and mud losses as routine occurrences, they insisted that the loss zone was effectively contained at 3,200 metres by injecting mud chemicals of a higher density, before further drilling was undertaken. The report prepared for ONGC's senior management on the mishap does not mention the occurrence of fire.

Industry insiders say that before drilling reaches the stage of encountering uncontrollable pressures, there are several built-in warning signals that allow engineers to respond effectively.

These pressures, referred to in oil industry parlance as a "well kick" takes place when the pressure exerted by the mud chemicals is lower than that of the gas and fluids within the well, which could occur when there is insufficient mud being injected. A manual on well control practices prepared by the US-based oil giant Exxon notes that insufficient mud in a well has been the primary cause of 50 to 70 per cent of all the blow-outs that have taken place all over the world so far.

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While there are about 10 standard warning indicators that are monitored on a continual basis as drilling is in progress, in this case, the ONGC had one vital bit of information even prior to the commencement of drilling. The geo-technical order (analysis of well-related geological data) that was available before the well was spudded, clearly indicated the presence of a high pressure zone in the region. While this does not necessarily rule out prospects for drilling, it did forewarn ONGC's engineers about the possibility of a well kick.

Currently, the well is still active, but the possibility of a blow-out is ruled out. The drill ship Sagar Bhushan has been shifted to a safer location, but cannot be redeployed elsewhere as its blow-out preventer is still in the affected B-60-1 well. Two experts from the US-based oil-field disaster management firm, Boots & Coots, visited the site, but are yet to recommend a course of action. A

decision to kill the well, however, has already been taken.

The job on hand now is to release the pent-up pressure of gas and fluids inside the well, which is to be done with the drilling of a relief well diagonally to connect with the affected well subsea. Even as a decision on how and when to do this is yet to be taken, the ONGC management is planning to contact several other disaster management firms to help out. ONGC sources said that the drilling of a relief well would take anywhere between 15 days to a month after work begins.

Oil mishap in western region: Another well may be hit

The recent mishap at an oil well in the B-50-1 field of the western offshore belt that narrowly missed a blow-out, is likely to adversely affect production at another oil field in the region. This is because salvage operations in the B-50-1 field following the mishap can

be carried out only by redeploying equipment that are scheduled for elsewhere. The salvage operations most likely involve the drilling of a "relief well" in the B-50-1 field to connect the affected well diagonally to release the pent up high pressure that has formed within.

The vessel shortlisted for this mission by the Oil and Natural Gas Commission (ONGC) is the Viking drillship which has recently been requisitioned from Singapore to carry out "work over" or clean-up operations at a well, named D-18-3, in the B-50-1 High area. ONGC officials, however, said that a final decision on deploying the Viking drillship is yet to be taken.

If Viking is deployed for drilling a relief well in the B-50-1 field over the next few days, it will delay the "work over" operations in the D-18-3 well. This, in turn, will also delay the resumption of production operations at the D-18-3 well by a semi-submersible floating production system, Tahara, that has been specifically contracted for the job.

The D-18 field, which is a major oil field with estimated reserves of 2 billion tonnes of oil and oil-equivalent gas, has about three production wells. A reduction in pressure over the last few months at one of the wells, D-18-3, had led to a drop in production, following which the ONGC decided to carry out "work over" operations. This basically involves servicing, and cleaning up of impediments such as sand, to boost production levels.

Production at the D-18-3 well was carried out by an early production system which is a floating semi-submersible equipped with its own processing, storage and transportation facilities. Such systems are deployed in oil fields where it is not feasible to install elaborate processing platform well structures that are not only expensive, but also take three to four years for commissioning after work starts.

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agonising plight of Bhopal gas victims

The agony of the Bhopal gas tragedy claimed over 3,500 lives is still, six years of seemingly unending wrangles, on over five lakh affected faces that survived the tragedy. The suffering among the affected population in Bhopal city are still high and those affected by the disastrous methyl isocyanate (MIC) gas, which leaked on the night of December 2-3, 1984, from the Union Carbide Corporation's (UCC) pesticide plant in Bhopal, have no choice but to wait for an elusive settlement out of court or otherwise.

In 1985, Parliament passed a law — Bhopal Gas Leak Disaster (Processing of Claims) Act — empowering it to represent all Bhopal gas victims. The Union Government sued UCC on behalf of the victims in the US District Court, New York City, presided over by Judge John F. Keenan. In May, Judge Keenan ruled that the US was an inappropriate forum for Bhopal trial and sent the case to India. Though India appealed against it, the Federal Appeals Court upheld the dismissal of US cases in January 1987 and transferred the case to India.

The court ruling on oleum gas leak in Shriram Food and Fertiliser at New Delhi in December 1985 and the Supreme Court judgement in December 1986 dramatically changed the legal status of the Bhopal case. According to the Supreme Court judgement, the amount of compensation to be paid by the defaulting company would be dependent not only on the extent of the damage caused but also on the assets and property of the company.

Further, the company would be wholly responsible for the disaster whatever the case may be, the court said. The survivors of the world's worst industrial disaster had a glimmer of hope on December 17, 1987 when the Bhopal Court Judge, Mr. M.N. Deo, ordered UCC to deposit in his court Rs. 350 crores for payment of substantial interim

compensation and welfare measures to the 5.5 lakh gas victims.

This order was challenged by UCC in the Madhya Pradesh High Court which on April 1988 reduced the amount to Rs. 250 crores. On another application of UCC, the Madhya Pradesh High Court ordered on October 11, 1988 the transfer of the case from Mr. Deo's court to another senior judge of the Bhopal Court against which the Union Government appealed to the Supreme Court.

On February 14, 1989, a five-judge constitution bench presided over by the Chief Justice Mr. R.S. Pathak, ordered UCC to pay Rs. 715 crores in full and final settlement of all claims, rights and liabilities arising out of the Bhopal gas tragedy. In March 1989 several organisations and concerned citizens filed petitions challenging the Supreme Court settlement. In May, the court passed an

order which explained the February settlement, but also said that if the basic assumptions underlying the settlement are "wholly unrelated to realities" it would withdraw orders.

In December the Supreme Court upheld the constitutional validity of the Bhopal Act of 1985. However, the court order stressed the Government's obligation under the Act to consult the victims and to provide interim relief to them. It also ruled out quashing of criminal liability against Carbide.

With the formation of the National Front government at the Centre, the Rs. 715-crore settlement reached at the time of the Congress (I) government with UCC was opposed in July in the Supreme Court. After a marathon two-month hearing, the constitution bench headed by the Chief Justice, Mr. Sabyasachi Mukherji, reserved judgement in the case. But the death of Justice Mukherji necessitated a fresh hearing.

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The re-hearing of the case challenging the constitutional validity of the Bhopal settlement commenced on November 11 this year.

Presently, the matter is heard by a five-member constitution bench presided by the Chief Justice, Mr. Ranganath Misra. Under these circumstances, even if a settlement is reached through the courts, the compensation received by the victims in actual terms would be much less taking into consideration the physical and financial deterioration of the gas-affected during the case's pendency, voluntary bodies fighting the case say.

Several medical studies conducted on the gas victims have pointed towards "systemic and persistent toxicity" in the bodies which poses long-term damages to present and future generations.

Medical reports also ruled out the Union Carbide theory that "MIC" causes only local damages to eyes and lungs and thereafter gets destroyed on contact with water on these body surfaces.

Meanwhile, the latest annual report of the Indian Council of Medical Research's Bhopal Gas Disaster Research Centre (BGDRC) provides evidence of continued harmful effects of violent chemical reactions and leakage of toxic gases, according to an expert committee headed by Dr. S. Vardarajan, Secretary, Department of Scientific and Industrial Research.

The report was placed in Parliament on December 20, 1985, and the Government accepted the report in toto. The report also described theories of sabotage often repeated by UCC as mere "after thought".

Six years after the tragedy some key issues concerning relief and rehabilitation of the gas victims remain to be addressed, says the Bhopal Gas Peedit

Mahila Udyog Sangathan, Bhopal Gas Peedit Sangharsh Sahayog Samiti and the Bhopal Group for Information Action.

The Bhopal Gas Peedit Mahila Udyog Sangathan has claimed that around 20,000 lives were lost in Bhopal since the gas tragedy in December 1984.

Its conventor, Mr. Abdul Jabbar Khan, said the figure includes over 10,000 persons whose names were registered in the Collectorate as having died of the after-effects of the gas leakage.

The figure also comprised infants who could not live for long as their mothers were suffering from the after-effects, he said.

He alleged that the Madhya Pradesh Government has not taken any steps to rectify the mistakes committed in the medical categorisation of the Bhopal gas victims.

The Sangathan claimed that almost six years after the disaster, the financial, social and physical problems of the Bhopal gas victims have not decreased.

They also charged that about one lakh children living in the 36 gas-affected wards of Bhopal have been deprived of compensation as they were wrongly informed that those below 18 years of age could not file their claims.

They said that during the last two years, there was "absolutely no progress" on schemes for financial rehabilitation of gas victims and setting up of a special industrial area to provide them jobs.

A lot of irregularity are being committed in the distribution of interim relief to victims.

The Supreme Court on March 13, last approved with certain modifications the recently announced interim relief by the

Centre at the rate of Rs. 200 per month per individual to about five lakh victims. The victims of the tragedy continue to suffer from neglect at the hands of government and society. In the last five years, over 1,300 people have died without getting a rupee as relief.

DAE ACTION PLAN TO CHECK INDUSTRIAL MISHAPS

The Department of Atomic Energy (DAE) has initiated an accident-prevention programme in all its major operating facilities in the country. The programme is designed to ensure that each employee can carry out his assignments without risks to his health or to that of his colleagues, according to official sources.

To achieve this objective, routine surveys are being conducted to assess the hazards from air pollutants in different industrial operations.

Ventilation surveys are being conducted to verify if the exhaust provisions in the work areas is effective. Physical agents like noise, illumination and microwave radiation are evaluated.

According to the sources at Bhabha Atomic Energy Research Centre (BARC) Bombay, a country-wide natural radiation survey using thermoluminescence dosimeters has been carried out.

The survey has yielded radiation zones of widely varying levels, which correlate closely with the known geological formations, the BARC sources said.

The Deccan plateau, consisting mostly of basalts of very low primordial radioactivity had shown the low radiation level, which included cosmic components also. The monazite region of the western and eastern coasts of granite rocks of northern and north-eastern India had shown the high radiation levels, the sources revealed.

IPCL — disaster and implications

The disaster that struck the Mahanagar Gas Cracker Complex (MGCC) of the Indian Petrochemicals Corporation (IPCL) at Nagothane recently, has claimed 31 lives so far, and badly upset the expansion programme of the public sector firm. The grassroots petrochemical complex, set up at an investment of Rs. 1,400 crores, was all set to be a commercial supply of important petrochemicals, like low density polyethylene (LDPE), since production had begun. The loss of production adds further importance since domestic supply of these materials would have cost precious foreign exchange in a situation of acute external payments difficulties.

Immediately after the tragic gas leak and explosion, the government announced a high level technical committee to enquire into the cause of the accident, and to recommend further safety measures that could avert such mishaps in future. The committee will be headed by Dr. R.A. Mashelkar, the Director of the National Chemical Laboratory, Pune. Mr. V.H. Chaudhari, Director (Technical) of Hindustan Organic Chemicals would be the member-secretary of the committee.

While IPCL officials have maintained that the exact cause of the accident

would be identified by the high-powered committee, it is clear that the company did not have in place, the kind of disaster management plan that is required under the amended Factories Act. In retrospect, it is apparent that the death toll perhaps would have been lower if the workers, as well as the staff of other factories, who rushed to the accident site and were roasted alive, had been trained to deal with disaster contingencies.

The Factories Act clearly states under section 41(b)(4), that every occupier shall with the approval of the Chief Inspector of Factories, draw up on-site emergency plans and detailed disaster control measures for their factory, and make it known to the workers employed therein and to the general public living in the vicinity of the factory. As is to be expected, the accident has angered the local population, who were even otherwise alienated by the failure of the MGCC to generate any additional employment for them.

A section of the residents have made demands to even close the complex so that such accidents would be avoided. And in a bid to clear the air of wild rumours, the IPCL management has denied that it is using any toxic gas in the premises, which could lead to heavy

deaths. As the official committee of enquiry begins its work, it is being conjectured, that the offsite battery limit (OSBL) plant or the feedstock receiver through which ethane and propane are channeled from the Uran plant of the Oil and Natural Gas Commission (ONGC), might have developed a leak due to metal fatigue. Once the leak occurs, the hydrocarbon mixture (gases) float just above the ground level, since they are heavier than the air. A minor spark is enough to cause the fire, which could in seconds, engulf the entire area.

IPCL has estimated the loss due to the accident at Rs. 30 crores, as the mother plant, i.e., the gas cracker unit, has not been affected by the fire. However, since production has started and the company was in the process of receiving orders from users, the sales loss may be significant. The company has maintained that it will take four to six months to restart the plant. It is estimated that the plant was working at less than 50 per cent capacity, and might have attained 60 per cent capacity utilisation by the end of the year.

Apart from the general impact on the petrochemicals industry, which is not yet fully known, the expansion plans of IPCL have themselves received a big setback. It is certain that the gas cracker complex that the company was planning

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to set up at Gandhar, will be delayed due to lack of funds. IPCL was hoping to raise funds for the new project out of the sales proceeds of MGCC.

The resource crunch that IPCL's expansion plans are likely to face, especially in the context of this accident, has yet again raised the issue of privatisation of public sector companies. According to Mr. Vijay Merchant, chairman of the All India Plastic Manufacturers Association, the lack of funds due to the MGCC disaster, should not hold up the Gandhar complex of IPCL. The company should either raise funds through bonds, or offer 51 per cent equity to the investing public to raise resources to offset the current loss.

IPCL has been a pioneer in the petrochemicals industry since its incorporation in 1969 as a public sector undertaking. The company produces a vast range of petrochemicals, and is widely regarded as one of the best-run

companies in the public sector. With the discovery of Bombay High crude oil in the 1970s, the need was felt to set up a new petrochemicals complex based on gas obtained as a by-product of oil extraction.

Studies indicated the possibility of setting up a 3,00,000 to 4,00,000 tonnes ethylene plant based on ethane and propane feedstock extracted from the associated gas in Uran. The Govt. of India chose Nagothane in Raigad District of Maharashtra as the site for setting up the petrochemicals complex. Given its record and experience of running a large integrated petrochemicals complex at Baroda, IPCL was entrusted the task of erecting and operating the MGCC.

When fully operational, the gas cracker complex will produce 4,00,000 tonnes of ethylene, 30,000 tonnes of propylene from the gas cracker, and 36,000 tonnes from the propane-propylene stream. The major products from

the complex would be the plastic resins, covering the entire range from low density polyethylene (LDPE), linear low density polyethylene (LLDPE), and high density polyethylene (HDPE) to polypropylene, ethylene oxide (EO) and ethylene glycol (EG). The various grades of polyethylene are used in the conventional plastic applications, whereas ethylene glycol is used as an intermediate in polyurethane while the different uses of polypropylene constitute an expanding list.

IPCL officials maintain that they have not made any compromises on either safety or quality while erecting the plant. According to them, the plant has incorporated the latest technology available in the world, and technical laborators have been enjoined under terms of the agreement, to pass on any improvement or modification to the Indian plant. The technology has been provided by the well-known Stone Webster Engineering Corporation of US.

The accident has once again brought to the fore the environmental hazards of big petrochemicals complexes. Right now, it is to be seen whether the much-awaited expansion of the Mafatlal Group's National Organic Chemicals Ltd. (NOCIL), will go ahead smoothly or face some renewed safety hurdles in the wake of the MGCC accident.

The need to evacuate workers promptly from the accident site, proper rehabilitation programmes for the people displaced by the projects, and a greening programme for the area around the complex, have been identified as critical items on the safety checklist. It may be recalled that when the MGCC complex was conceived, there was a plan to develop a surrounding green belt of around 370 acres. The petrochemicals industry, which is just around three decades old, has ambitious expansion plans over the next few years. Inclusive of the MGCC complex, the government has sanctioned 11 petro-



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complexes to be set up in the Eighth and Ninth Plans. The cracker at Hazira, the naphtha cracker at Vishakapatnam, the gas cracker at Auraiya in Uttar Pradesh, the cracker at Gandhar, NOCIL's cracker plan at Thane, Maharashtra, 100 per cent export-oriented naphtha cracker in Tamil Nadu, the Haldia petrochemicals complex, the aromatics cracker at Saleempur — these are among the projects awaiting execution in coming years.

Work has already commenced in some of the projects, like Haldia in West Bengal. Besides, the govt. has also accepted the recommendation of the empowered J.J. Mehta Committee regarding the minimum economic scale of projects which would mean that complexes would be gigantic and would involve heavy investments. The need to take the population into confidence, and to include them in the growth process can never be over-emphasised, after the experience.

A paper prepared by the FICCI "The Chemicals Industry in 2000 AD", states that the level of investment needed to bridge the gap between the demand and supply of petrochemicals by the end of the century would be between Rs. 10,000 and Rs. 26,000 crores. This is close to the estimate prepared by the V. Kapur Committee on Perspective Planning for the Petrochemicals Industry, which submitted its report to the government in 1986. Since the international prices of petro-products have been rising continuously, and have gained further momentum in the wake of the Gulf crisis, the urgency of speed-implementation of these projects becomes manifest.

The FICCI paper has urged the provision of feedstock, fuel oil, and energy to the petrochemicals sector at internationally competitive prices, the establishment of parity between domestic and world prices, the opening of new markets especially for exports, and the modernisation of tech-

nology. Now, in the wake of the IPCL experience, the institution of adequate safety measures and contingency plans, for both the workers as well as the people residing within a certain radius of the plant, should also be given the priority they deserve. These, as much as any of the other factors, also seem vital for the healthy growth of the petrochemicals sector in the country.

CPCB READY TO PAY 50% OF SSI WASTE TREATMENT PLANT COSTS

The Central Pollution Control Board (CPCB) is willing to bear 50% of the cost of setting up effluent treatment plants (ETPs) in small scale units where waste water can be recycled. The CPCB chairman, Mr. N.S. Tiwana, said in Calcutta recently that the board had identified several SSI units where the consumption of water can be reduced and its quality can be improved. The CPCB is now in the process of identifying units in other sectors where ETPs would be

useful. However, the problem of supplying safe water in cities is worrying the authorities because sewerage systems in densely populated areas had been neglected in spite of increasing urbanisation. The board anticipates a drastic shortage of water in cities by the year 2001 when the demand for potable water is expected to shoot up to a billion cubic metres. Water supply schemes are costly and the search for cheaper and safer pipelines should be intensified.

TREATY TO FIGHT OIL POLLUTION

A new international treaty designed to help governments combat major oil pollution incidents has been signed in London at the end of a two-week conference attended by delegates from 90 countries. The treaty — the international convention on oil pollution preparedness, response and co-operation, 1990 — was developed following a meeting of leaders of the major industrial nations in Paris last year.

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Fertiliser producers seek retail price hike

The Fertiliser Association of India (FAI) has suggested that the government should gradually increase the retail price of fertilisers to reduce the ever-rising fertiliser subsidy.

The FAI chairman, Mr. H.S. Bawa, told newsmen at New Delhi on December 5, that a 10 per cent increase in retail prices can reduce the subsidy by Rs. 500 crore. He pointed out that while the retail price has been unchanged since 1981, the prices of inputs required for fertiliser production have been raised frequently, increasing the subsidy burden on the national exchequer.

Mr. Bawa clarified that FAI was not in favour of any sharp increase in retail prices but only wanted gradual increases to keep the subsidy bill under check. Pointing out that the subsidy is actually benefitting the entire food economy, he said only a very small fraction of the

subsidy accrued to the industry in the form of statutorily permitted profits. Unfortunately, the industry's viewpoint on this issue is not appreciated by the government, he added.

Frequent changes in retention price scheme (RPS) effected by the government to make small savings in subsidy has created uncertainty in the minds of entrepreneurs. They are not coming forward in large numbers to set up new projects.

The capacity addition in the industry has, in fact, slowed down considerably during the recent years. Moreover the shortfall in indigenous supplies cannot be met fully through imports because of foreign exchange crisis and sharp rise in nutrient prices in the international market. Mr. Bawa cautioned about a possible fertiliser shortage during the current rabi and serious problem in kharif 1991. According to a FAI back-

ground paper the government had decided to sanction only one-fourth the total foreign exchange required for phosphatic fertiliser imports during the remaining period of 1990-91. This will either affect or restrict substantially the phosphatic fertiliser consumption during the current rabi and leave little stocks for the beginning of kharif. The problem has been compounded by the government's decision to allocate a small fraction of the foreign exchange requirement for import of phosphoric acid required for the production of diammonium phosphate (DAO).

The delay in acid imports has already led to the closure of six DAP plants and a cutback in production at two other plants. DAP units were also plagued with acid shortages in the previous year and the overall capacity utilisation in the phosphate industry is expected to be about 67 per cent, the same as in 1989-90.

Mr. Bawa reiterated the industry's demand for payment of standing charges to DAP plants during the period of their closure because of unavailability of imported acid. He suggested the government should give incentives to old but efficiently operating plants to enable them to expand. Incremental production can be achieved with minimal investment.

Talking about the prospects of Chemical's rights-cum-public issue in view of the unattractive returns on investment in fertiliser industry, he hoped the issue will succeed. The investors have a certain amount of confidence in certain entrepreneurs.

When they see Tatas (Babrana project) and Birlas (Gadepan project) investing hundreds of crore of rupees in gas-based fertiliser units, they feel entrepreneurs will make their projects a success and convince the government for suitable changes in RPS, he said.

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FAI plea for new fertiliser units

country is going to face an acute fertiliser shortage from next year with domestic production and imports becoming impossible due to the foreign exchange crunch.

According to the latest assessment of the fertiliser situation by the Fertiliser Association of India (FAI), the Government should take immediate steps to commission new manufacturing units and encourage maximum production in the existing ones.

FAI, an association of fertiliser manufacturers including the public and co-operative sector ones organised its annual seminar on the "fertiliser scene in the nineties" at New Delhi on September 6. Several foreign specialists took part in it.

Earlier, Mr. Pratap Narayan FAI Executive Director said, the looming shortage of fertilisers could jeopardise the Government's plan to divert a higher percentage of investible resources to the industrial sector in the Eighth Plan and crack the national food security system. An acute fertiliser shortage would end up farmers paying a black market price and the middlemen taking advantage of such a situation, he added.

During the current year, fertiliser consumption may rise to a record 12.3 million tonnes while the indigenous production is expected to be only 8.6 million tonnes. However, with the carry-over stocks, things could be well managed for the year, the FAI study said.

However, from next year onwards, production will be stagnant as no new unit is expected to be commissioned. In fact no new units are yet planned for commissioning during the Plan period. Mr. Narayan said as the prospects of large scale fertiliser imports had been ruled out by the Government, immediate steps should be taken to remove the

constraints imposed by the policy decision to ensure maximum production from the existing units.

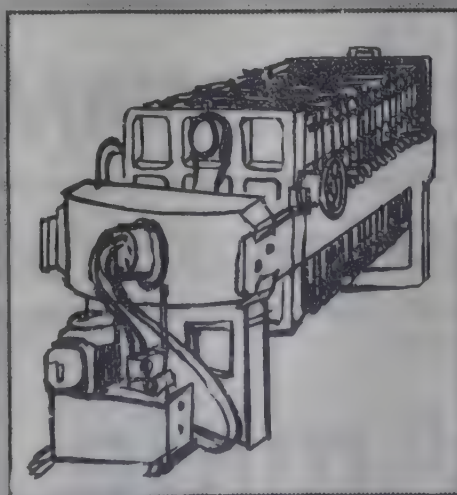
He also wanted the Government to accord priority to allocating natural gas to fertiliser units. "Electricity can be produced even from coal, but gas is the ideal feedstock for fertilisers", he added. Mr. Narayan said the existing pricing policy decided by the Government for fertilisers was hampering new investments in the sector. He wanted the Government to review the unilateral decisions that affected the profitability of fertiliser plants, 72 per cent of which are in the public and co-operative sectors.

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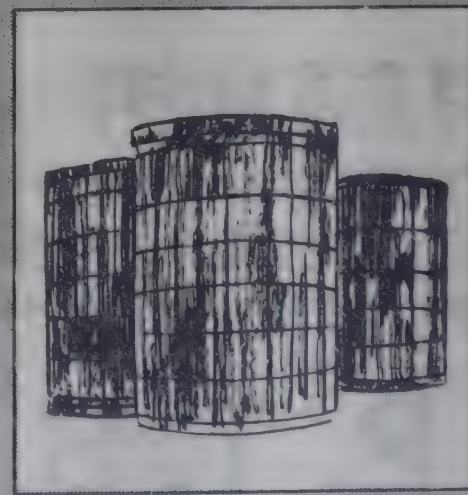
try to tolerable levels, according to studies conducted by scientists at Rajasthan University. Laboratory tests and research work over the past ten years with various types of rodenticides and their evaluation in the field conditions had revealed that the best method to reduce the rodent population was through chemicals, followed by trapping and fumigation. Mrs. Y. Saxena, Associate Professor, zoology department of the university, who led the research team, said that several conventional control methods such as sanitation, manipulation by biological, mechanical, chemical and behavioural methods, habitat manipulation and environmental management had been used for the past 65 years. Of these, control through chemicals is the "most expedient and immediate" means of reducing rodent population, she added. Mrs. Saxena said that rodents constituted one of the single most important group of pests because of their lethal role in destruction of the food and life of humankind.

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FACT sales rise sharply, profits up

As the foreign exchange starved nation struggles to supplement its fertiliser stocks through heavy imports, encouraging news comes of excellent capacity utilisation and production from the Fertiliser and Chemicals Travancore Ltd. (FACT).

While news of India's imminent entry into the world market has jacked up international fertiliser prices, FACT has registered a substantial rise in sales turnover and notched up handsome profits during the first six months of the current year. Moreover, for the first time during the last 17 years, FACT has also achieved full capacity utilisation at its ammonia plant in the Cochin division.

This implies that the annual ammonia import bill for FACT will have been drastically reduced with this unit alone requiring 1.5 lakh tonnes of imported ammonia for producing nitrogenous fertilisers every year. This could not have come at a better time because FACT's

caprolactam plant — another guzzler of ammonia — has been commissioned. Meanwhile, net sales of FACT shot up from Rs. 129 crores during the first six months of last year to Rs. 234 crores during the same period this year. As a result, gross zoomed to Rs. 13 crores from a loss of Rs. 11 crores last year for the same period.

With the 25 per cent Gulf surcharge, it has been estimated that the fertiliser subsidy this year might jump to a whopping Rs. 4,000 crores. The divergence between consumption and production is also likely to be more marked leaving a gap of 1.78 million tonnes, which will have to be met through imports.

With the current power cuts imposed and the restrictions on the import of phosphoric acid, the production capacities of this southern fertiliser giant remained underutilised and sales plummeted from Rs. 438 crores in 1988-89 to Rs. 358 in 1989-90. If the current

production trend is maintained in coming dry summer months, when possibilities of power cuts are great, only then can the unit hope to overtake the production achieved in 1988-89.

There is also the problem of reduction in the import of naphtha, a vital requirement for all fertiliser units. It has been reported that the reduction in production of fertilisers in the country has been the direct result of a cut in import of crude in the wake of the oil crisis. The ammonia unit in the Cochin division with a capacity of 600 tonnes per day achieved full capacity utilisation in August this year and produced around 18,000 tonnes of ammonia.

This is also good news for, the newly commissioned caprolactam project. FACT would have pushed up import requirements of ammonia to 2.3 lakh tonnes annually. With the soaring price of ammonia in the international market, this would have entailed a heavy drain on the precarious foreign exchange kitty.

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INDUSTRIAL EXHIBITION IN BOMBAY

Shri Bhagubhai Mafatlal Polytechnic will be organising an exhibition of industrial products, in collaboration with the Alumni Association of the Polytechnic in the spacious campus of the Polytechnic from Jan. 18th to 20th, 1990 (Friday through Sunday). To be organised with a specific view to (a) display the products manufactured/fabricated by the past students of this Polytechnic (b) encourage new entrepreneurs, the exhibition will be conducted entirely on a non-commercial basis. It is estimated that the number of stalls would be in the region of 100. The exhibition is likely to be inaugurated by a dignitary from the industrial field.

Further enquiries can be had from Shri A.N. Sanghvi, Dean, Administration, Shri Bhagubhai Mafatlal Polytechnic, Irla Juhu Rd., Vile Parle (E), Bombay 56. Tel.: 6140022, 6142252, 6142252.

Company Notes

AMINES

art-finance the cost of expansion, amines Chemicals will be shortly a rights issue of partly convertible securities of the aggregate value Rs. 482.15 lakhs and non-convertible securities of the aggregate value of Rs. 1.80 lakhs, for which the CCI approval is awaited. The company's expansion programme of setting up a plant for manufacture of methylamines and ethylamines at the existing site is being implemented as per plan.

Meanwhile, the company's net sales for the months ended September 1990 were Rs. 550.92 lakhs compared to Rs. 375.44 lakhs from same period last year, an increase of 47 per cent. The net profit for period amounted to Rs. 27.26 lakhs against Rs. 49.97 lakhs (Rs. 89.26 lakhs if insurance claim against losses due to flood is accounted) for the corresponding period of the previous year. The net profit for the period amounted to Rs. 90.06 lakhs, compared to Rs. 19.62 lakhs (Rs. 52.91 lakhs if insurance claim is accounted).

PAK FERTILISERS

Pakistan Fertilisers and Petrochemical Corporation has produced good results during the six-month period ended September 1990. The gross profit has taken a quantum jump to Rs. 19.17 crores from Rs. 10.04 crores in a similar period last year following a marked increase in turnover to Rs. 35.60 crores from Rs. 19.80 crores. The net profit has shot up to Rs. 15.19 crores from Rs. 5.60 crores after depreciation (Rs. 3.98 crores against Rs. 3.35 crores) and tax (nil against Rs. 1.08 crores).

During the period production of ammonia was 23 per cent higher compared to the same period as the plant operated at 109 per cent capacity against 88 per cent. Sales of ammonia were up

by 57 per cent during the period. Pending finalisation of retention price of ammonia, the results are prepared on the basis of the provisional retention price. The company's turnover includes Rs. 8.18 crores being dividend on units of UTI (Unit Trust of India).

Commercial production from some of the new plants is expected to commence before March 31, 1991 and considering large admissible tax depreciation on new plants, no tax liability for the current year is expected to arise. All the new projects under implementation entailing a total capital outlay of around Rs. 396 crores, are progressing well. Expenditure already committed exceeds Rs. 300 crores and these plants are expected to be commissioned during March-June 1991.

CLOSELY-HELD APAR TO MAKE PUBLIC ISSUE FOR NEW UNIT

The Rs. 148 crore Apar Ltd. a closely-held company will enter the capital market this month with its maiden equity issue for its new company—Gujarat Apar Polymers Ltd.

The Apar group now has three divisions—speciality oils, speciality rubber and latex and bulbs, tubes, speciality lamps and luminaires marketed under the brand 'Cema'. The speciality oils division, set up in technical collaboration with Sun Oil Co. of US, has an annual capacity of 65,000 kilolitres. Apart from being a leading processor of paraffin oil for the past 17 years, Apar also has a 50 per cent market share in transformer oils.

The speciality rubbers division produces a wide variety of high styrene self-reinforcing styrene butadiene rubber (SBR) and latex for use in ebonyites, caster wheels, battery containers, shoe-soles and floorings. The company also has a Rs. 10.5 crore lamp complex in Gujarat and undertakes conversion of aluminium ingots into rods and manu-

factures solid state devices.

In 1989, Apar Ltd. registered a turnover of Rs. 78.21 crore and a gross profit of Rs. 6.45 crore and hopes to raise them to Rs. 147.74 crore and Rs. 11.7 crore, respectively during the current year. Speaking to reporters at Bombay on Nov. 5, Dr. N.D. Desai, chairman and managing director of Apar Ltd. said the country was importing rubber worth Rs. 600 crore every year which he felt, was totally unnecessary.

Dr. Desai, who is also an advisor on the DGTD panel on rubber, said domestic demand for synthetic rubber would grow rapidly. To meet this demand, the Apar group is launching Gujarat Apar Polymers Ltd. for manufacturing 6,250 tonnes of acrylonitrile butadiene rubber (NBR) and latex at a cost of Rs. 38.30 crore. The company has been co-promoted by Gujarat Industrial Corporation Ltd. in the associate sector.

Dr. Desai said about 6,500 tonnes of NBR were imported last year, mostly from Japan, South Korea, Canada, the US and Germany. At present, there is only one NBR manufacturer in the country with an installed capacity of 2,000 tonnes and its annual production is meagre.

Gujarat Apar has entered into a technical collaboration with Goodyear Tyre and Rubber Co. of the US. NBRs are widely used in rice dehulling rollers, moulded and extruded goods, oil hoses, gaskets and seals, beltings and oil resistant rubber components requiring cold flexibility for applications in aviation, automobiles and railway parts.

The Rs. 38.30 crore project will be financed by a rupee term loan of Rs. 22.35 crore, foreign currency loans of Rs. 1.49 crore, cash subsidy of Rs. 30 lakhs and an equity capital of Rs. 14.16 crore. The promoters are contributing 40%, or Rs. 6.07 crore, of the equity capital, GIIC Rs. 1.56 crore,

Rs. 75 lakh has been allotted to the Asian Development Bank and Rs. 1.04 crore to Unit Trust, ICICI, Indbank Mutual Fund and SBI Mutual Fund. The balance Rs. 4.74 crore will be offered to the public through a prospectus.

TATA CHEMICALS PROSPECTUS: CAUTION IS THE WATCHWORD

The prospectus of Tata Chemicals Ltd., (ITC) is a study in contrast. Its cover page cautions the prospective investors of what could well be in store for them.

Thus, there is a front-page 'caution' all in red ink, which tells those browsing through the 36-page document that they should specifically read certain clauses in the prospectus.

The 'caution' box reminds one of the 'danger' signals dangling before high-voltage transmission lines, with only the ubiquitous skull and bones missing. Alongside, but again on the cover, TCL states: The proceeds of this issue will be exclusively utilised to part-finance the implementation of the Tata Fertiliser project at Babrala — now a division of the company.

TCL however, explicitly volunteers the assurance, with the consent of the Controller of Capital Issues that, in the unlikely event of the proceeds realised for this issue not being utilised for the purpose for which it is made, TCL will refund such proceeds to the subscribers together with interest calculated at 15 per cent per annum.

It is not clear whether CCI had made it mandatory for TCL to print the warnings. For that reason, however, the prospectus is unique.

And what do the clauses meant for compulsory reading suggest?

The caution box says.. before deciding to subscribe to this issue, you are

requested specifically to read: 1 (II) page 3, item 17 (V) page 19, item 18 page 21 and also item 6 (4) page 6 and item 17 (XI) page 20.

TCL issue of capital of Rs. 400.375 crores is dedicated to the implementation of the fertiliser project. Out of this, the rights issue of 12.5 per cent partly convertible debentures of the face value of Rs. 196.875 crores of which Rs. 9.375 crores is reserved for employees, and 14 per cent non-convertible debentures of the face value of Rs. 123 crores.

The public issue is 12.5 per cent partly convertible debentures of the face value of Rs. 80.50 crores of which Rs. 38.50 crores is reserved for preferential offer to the shareholders and Rs. 4.025 crores for the employees.

The rights issue opened on November 1 and public issue will open on December 10.

According to caution item 17 (V) page 19 the feedstock, as envisaged in the project reports is natural gas, to be made available by the Gas Authority of India (GAIL) through the HBJ pipeline. With a view to protecting the allocation of gas supply to the company's fertiliser project.

The company was reluctantly compelled to file a writ petition before the High Court of Delhi seeking redressal.

The company has however, made it categorically clear that it will sign the contract for supply of gas on terms and conditions which are judicially held to be fair and reasonable.

Some important factors to which investors specific attention is drawn in the explanatory brochure says... the prospective investor should bear in mind that the prices of fertilisers are determined by the Government and sale of fertilisers is somewhat dependent on climatic conditions.

On the other hand, attention must be drawn to the fact that fertiliser is a vital input for the production of food required for our growing population. It is reasonable to expect that the Government policies will not hurt the fertiliser industry.

In fact, a fertiliser project which is technologically and financially sound, well founded and is well managed can yield handsome rewards to the investors.

The present status of the project is that at the time of reporting, the company has achieved an overall progress of about 23 per cent towards the implementation of the project — it has incurred an actual expenditure Rs. 6 crores and committed an expenditure of Rs. 161 crores up to August 31, 1981, barring any unforeseen or unforeseen circumstances, the mechanical completion will be achieved in 36 months from the date of placement of effective orders to foreign and Indian suppliers and the complex will be commissioned within six months of the mechanical completion.

TIDCO TO DISINVEST IN PENTASIA CHEMICALS

The state-owned Tamil Nadu Industrial Development Corporation (TIDCO) is disinvesting its 26 per cent stake in the joint sector Pentasia Chemicals Ltd., in favour of Asian Paints, the private promoter.

The upset price of Rs. 25 for Rs. 10 share of Pentasia (now quoted around Rs. 34 in the Madras Market) has been accepted by Asian Paints. The deal awaits clearance from the institutions, CCI and MRTP.

Once it becomes a subsidiary of Asian Paints, Pentasia is expected to receive an effective support from the parent company for speedy revival. Pentasia's accumulated losses as on March-31, 1981 year came to Rs. 5.25 crore.

this year itself, TIDCO planned out of the joint sector unit. But the government told the corpora- defer the proposal after noticing or performance of the company fluctuating share prices.

n Paints too was not keen on ing its stake and preferred to wait operations of Pentasia stabilised.

unit was promoted by TIDCO sian Paints at a cost of Rs. 22 with a capacity to produce 3,000 s of pentaerythritol and 1,800 s of sodium formate.

e plant, located at the Sipcot com- at Cuddalore in South Arcot dis- was commissioned in October

er since it went on stream the unit een struggling to reach full capa- Projections on demand-supply for erythritol have gone haywire.

Against the current estimated demand of 7,500 to 8,000 tonnes, the capacity created comes to 13,000 tonnes.

Pentasia is forced to compete with six manufacturers in the field. The govern- ment has also delicensed the manufac- ture of the raw material.

During 1989-90, it achieved a capa- city utilisation of 80 per cent producing 2,376 tonnes of pentaerythritol and 1,156 tonnes of sodium formate.

At one stage, the company faced the threat of complete erosion of its Rs. 7.35 crore equity by the accumu- lated losses and become a BIFR case. Luckily, Asian Paints intervened to extend a good price support for penta- erythritol, which improved the price real- isation for the material.

Reflecting the improved performance of the company in the current year, Pen- tasia has reported a turnover of Rs. 6.15

crore during the six month period ending September 30, 1990 against Rs. 5.13 crore in the corresponding period last year.

It has earned on operating profit of Rs. 95.26 lakh (Rs. 6.04 lakh loss) and has managed to contain the net loss to Rs. 2.44 (Rs. 1.03 crore). During the 12 month period in 1989-90, the company reported an operating profit of Rs. 94.08 lakh on a turnover of Rs. 10.31 crore. After providing for depreciation and interest charges, it suffered a loss of Rs. 1.01 crore.

In the light of a discouraging outlook for the paint industry, the company is not sure about sustaining a good show in the latter half of the current year. Added to this, it faces the problem of availability of acetaldehyde from distil- leries, because of the cheap liquor policy. It is also yet to get an IFST of Rs. 20 lakh from the government. Besides, export prospects are not good.

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Commerce, industry ministries may be merged

The ministries of commerce and industry are likely to be merged, going by the speculation doing the rounds in Udyog Bhavan. The possibility is that the two ministries may have a common secretary.

Another view is that the two ministers will have independent secretaries both of whom would, however, report to a principal secretary. In other words, the principal secretary would have overall charge of the two ministries.

Sources at New Delhi say that the proposed move is expected to help in bringing about proper co-ordination between the industrial and export import policies.

While it is too early to talk about the seriousness of the move, the fact is that the subject has become the talking point

among the officials in Udyog Bhavan.

In the event, the move becomes a reality, the sources say, the ministry of textiles will cease to have an independent existence. In all likelihood, it will be merged with the commerce ministry.

In fact, for quite some time, it is being felt that it is meaningless to have a separate ministry for textiles. After all, its major functions are to deal with exports. The subjects relating to production (industrial, that is) could be dealt with the ministry of industry.

In other words, work relating to exports could go to commerce and production to industry ministry.

Another argument in this regard is that exports, per se, come under the commerce ministry and, therefore, there

is no justification for the subject (textiles) to be administered by another ministry.

More important, it is the commerce ministry which participates in the negotiations relating to international trade in textiles and allied issues as a whole. Therefore, the need for bringing the textile ministry under commerce

This apart, the speculation is that the present commerce secretary, Mr. Shukla, may be elevated as finance secretary.

The argument in this regard is that the Union finance minister, Mr. Yas Sinha, himself has sought Mr. Shukla's services. To add to it is the fact that the minister, an ex-IAS man of 1963, has a good rapport with Mr. Shukla, who is three years senior to him in service. Mr. Shukla is also from the Bihar cadre.

Sources at New Delhi say that even after the changes, the implementation will begin only after the completion of the current round of Uruguay trade negotiations. Mr. Shukla, is considered an authority on the issues relating to multi-lateral trade negotiations.

Mr. Shukla's presence in Brussels and his expertise, therefore, are considered invaluable. The government does not like to disturb any existing arrangement. In any case, all decisions will be taken only after the return of the team to Brussels. The team is returning on December 9.

The concurrence or otherwise of the new commerce minister, Dr. Subramanian Swamy, would also have to be taken for bringing about any change in the commerce ministry. At the same time, the fact that the industry ministry continues to be under the charge of the Prime Minister is being taken into account. It is expected that changes are definitely afoot in the next few days.

— Economic Times

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PORTS TO RUPEE PAYMENT NATIONS

per cent ceiling fixed on import content

The Commerce ministry has decided to fix the ceiling at 30 per cent for import intensity in goods being produced for exports to rupee-payment countries. In some genuine cases where exporters are constrained to exceed the ceiling limit, the government will give an undertaking from them to reimburse the excess foreign exchange lost before issuing any advance import licences to them.

Announcing this at an "open house" organised by the Federation of Indian Export Organisations (FIEO) at Bombay on December 7, Mr. A.K. Lakina, export commissioner, said that the government has resorted to this measure for conserving the country's fragile foreign exchange reserves, because most exporters to rupee payment countries imported a lot of inputs from the general currency area (GCA).

Mr. K.L. Rekhi, chairman of the Central Board of Excise and Customs (CBEC), either clarified or promised to consider a wide range of ambiguous provisions in the import-export policy which Mr. Ramu Deora, FIEO president, drew his pointed attention. Dealing with specific issues of anomalies raised by individual export houses, he also announced his decisions with their far-reaching implications. Mr. Rekhi announced that the CBEC has issued half-a-dozen guidelines to customs collectors so that they would pedal softly and not hurt the genuine trade while implementing the Section 67 provisions concerning bond-to-bond transfer of imported goods.

It was pointed out to him that the recent customs notifications No. 54/90 and 7/90 issued by the Bombay and Andhra customs houses, respectively, required importers to submit bank guarantees for 100 per cent of customs duty payable on imported consignments under bond-to-bond transfer basis. And

that resulted in blocking up of the respective guarantee limits of respective banks and also an additional charge of 1.8 per cent bank commission burden adding to the cost of import material. FIEO had urged CBEC to exempt importers from submission of bank guarantees in case of each and every imported consignment transferred under the bond movement, as required by customs.

Explaining the Customs' refusal of bonding facility to imports made by traders, Mr. Rekhi said that grant of any bonding facility to traders only meant deferment of revenue collection, which is not justifiable. "Even the U.S. has withdrawn such facility of bonded warehouses to private traders", he said.

Dealing with the complaints regarding customs' recent stipulation that

importers should produce manufacturers invoice (vide: notification 44/90), Mr. Rekhi agreed to examine a suggestion for shifting the subject from under Rule No. 10 to Rule No. 8. Mr. V.K. Gupta, collector of customs at Bombay Port, promised to continue to deal with the traders' bill of entry promptly if they give a declaration, under the provisions of the relevant notification, to the effect that they were unable to produce the invoices.

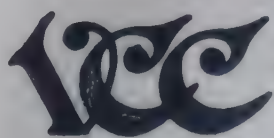
Dealing with another complaint by exporters of silk fabrics that customs is holding up large consignments of silk yarn of dupion quality imported under REP licences, under the duty exemption entitlement certificate (DEEC), scheme, even though the licences had been earned against export silk fabrics (mulberry quality), Mr. A.K. Lakina promised to initiate a proposal to clear the consignments on payments of normal duty. On the issue of excise duty refunds of more than Rs. 200 crore due to

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Scheme No. 6, Sion (East), Bombay-400 022.
Phone: 4072435, 4077431, 4077432, 4077433
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SHREER

various claimants, Mr. Rekhi said that the previous ministry at the Centre had decided not to pay them because the producers had already recovered them from customers. "Unless the government changes the decision, the question of payment of dues does not arise".

Mr. Rekhi promised that the CBEC will seriously examine a proposal to encourage indigenous manufacturers to supply machinery to 100 per cent export-oriented units (EOUs) at nil rate of duty against the furnishing of CT-3 Form. He, however, brushed aside yet another plea of 100 per cent EOUs against the withdrawal of notification 293/88-CE on the provision for sale of goods to domestic tariff area.

Mr. Rekhi declared that hence-forth the Customs department in Bombay would ensure that all laboratory test of samples drawn from export consignments would be made available within 45 days in at least "75 to 80 per cent

of the cases". Eventually, even this period would be shrunk to a few weeks. He also disclosed that the Customs had reduced the frequency of sample testing to as far apart as once in two years, in most cases.

Mr. J.G. Kanga, chairman of ECGC, brushed aside a plea for extending insurance cover for exports to Nigeria saying that the insured overdues from that country presently totalled Rs. 80 crore. However, in cases of exports where the concerned banks holding letters of credit have sufficient foreign exchange reserves for remittance, ECGC would consider offering insurance covers for that country on a case-to-case basis.

Earlier, Mr. Rekhi disclosed that in a random checking conducted recently of 18 containers, Customs in Madras found undeclared cargo in as many as 16 containers. In a similar checking of two containers in Bombay, Customs

have found undeclared goods, revealing that such frauds are place on alarming scales. He urged importers and exporters to bring notice of the authorities the b...ments in both the trading comm... as well as in the Customs departm...lier, Mr. Ramu Deora pointed out Customs officials the need to trust in the export community, b...the number of black sheep is neg...The government should not vi...the large majority of honest bu...men for no fault, of theirs, he

INFLATION AT 10.3 PER C

Inflation based on the variation of official wholesale price index continued to hover in the double digit range, worked to be 10.3 per cent during the week ended November 24, even though the index (based 1981-82) touched another peak at 184.5. The index for the previous week was 184.4. High prices of footwear made the index for... and leather products look up. In... in prices of sodium phosphate, chemicals and organic pigments... up the index for chemicals and... ical products. But the prices of... and castor oil declined. Higher prices of castings and spun pipes jerked... index for basic metals, alloys and... products.

COAL SUPPLY TO POWER PLANTS UP

Coal supply to the power sector recorded a 5.6% increase from 58.76 million tonnes in October this year over the corresponding period of 1989, according to India Ltd. (CIL) sources. The sources said the total supply during the seven months of the fiscal year was 55.64 million tonnes during the

The power sector accounted for as much as 56% of the CIL's despatches, the demand from the sector in 1990-91 stood at 108.0 million tonnes.

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Forex for public sector trading units stopped

With the country increasingly in a foreign exchange squeeze, the Union finance ministry has stopped release of foreign exchange to all public sector trading units for undertaking imports. The units have instead been told to go for short-term credit in the form of bankers' acceptances (BAs) or for suppliers' credit.

The finance ministry had earlier directed trading units to seek its permission before undertaking any import in order to ensure that adequate foreign exchange is available to back up the imports. Ostensibly, because of the empty coffers, the idea was to stop those imports which the country can do with-

But the finance ministry is obviously not in a position to veto essential imports like fertilisers. Therefore, it has directed the trading agency concerned (Minerals and Metals Trading Corporation Ltd.), to either extend its short-term debt limits and negotiate with the banks for funds or go straight for suppliers' credit. The ministry had even approved extension of short-term credit limits by an additional \$200 million in order to enable MMTC to undertake pending imports of fertilisers.

The corporation's earlier credit limit was \$750 million. Pertinently, the banks have shown their inability to garner short-term credit in the international markets on account of the current low credit worthiness of India.

In the past, additional sanctions had always been forthcoming. There have been instances where a combination of direct foreign exchange release and higher short-term limits were utilised to take care of import bills.

The finance ministry's rejection of foreign exchange allotment was felt acutely because of lack of back-up

credit from the banks. Therefore, for the first time, MMTC has been forced to resort to suppliers credit for import of di-ammonium phosphate (DAP). The corporation will also extend suppliers credit period for the import of phosphoric acid and ammonia from 60 days and 45 days respectively to 180 days. In all, about Rs. 100 crore of phosphatic acid imports, have to be undertaken. MMTC is likely to insist on 180-days suppliers' credit for all imports undertaken through this instrument of financing.

WORK ON SPONGE IRON PLANT OF GOLDSTAR APACE

Goldstar Steel and Alloy has made impressive progress in the implementation of its 2.2 lakh tpa sponge iron project at Malliveedu in Vizianagram district. Civil works are in an advanced

stage and mechanical erection will commence shortly. The plant is expected to go into production by mid-1991.

The Rs. 124.50-crore project has been promoted by Mr. N. Krishna Mohan and Mr. P.V. Prabhakar Rao and associates. The company has entered into a technical collaboration with Mannesmann Demag of Germany. The company's sponge iron plant is based on the Krupp Codir direct reduction process and the collaborators have given necessary performance guarantees. State-of-the-art technology has been adopted to suit Indian raw materials. Critical equipment for the plant is being imported from Mannesmann, and major indigenous equipment is being procured from Bucau Wolf, associates of Krupp. The Rs. 124.50 crores project is being financed by rupee term loans of Rs. 66.08 crores, foreign currency loans of Rs. 16.92 crores and equity capital of Rs. 41.50 crores.

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Aluminium exports may fall short of target

Aluminium exports this year may be much less than the planned level of 48,000 tonnes, the Secretary, Department of Mines, Mr. P.K. Lahiri, said on December 5. This is because the international prices of aluminium, which had been firm when the exports were planned, have declined now.

As a result, "our indigenous producers cannot effectively compete in the international markets", Mr. Lahiri said while addressing a national workshop on "Non-ferrous metals", organised at New Delhi by the Confederation of Engineering Industry (CEI). The Secretary dispelled the impression the industry was facing a shortage of aluminium owing to large quantities of the metal being exported.

He, however, admitted that a temporary setback might have developed owing to the export obligations of the National Aluminium Company (NALCO). He pointed out that even the temporary shortage would be eliminated as the planned level of exports are not likely to be achieved. In the long run, however, large capacities had to be created as the demand for this metal grew every year by five to six per cent.

The Government was already planning capacity additions to exploit the country's large bauxite deposits of about 2,650 million tonnes to the maximum, the Secretary informed the gathering. The industry on its part would have to aim for higher capacity utilisation. He also sought to dispel the impression that there was a shortfall in the availability of copper in the country.

There were adequate stocks with both MMTC and the public sector Hindustan Copper Ltd. On the other hand, the off-take was much less than the planned level, he complained. However, the Chairman of the CEI raw materials committee, Mr. Subodh Bhargava, clarified that the slow-down in off-take was due to disruptions in the political sit-

uation of the country and also due to problems like transportation

In the case of copper, again, the capacity utilisation was very low. There was a need for prospecting and expanding capacities as, at present, about 65 per cent, of the demand was satisfied by imports, he said. The capacity expansion in the Eighth Plan was likely to be 10,000-15,000 tonnes, which was not adequate.

In the case of other major nonferrous metals like zinc and lead, the Government had plans to expand capacity. The demand satisfaction of these metal is likely to increase to 85 per cent and 75 per cent respectively, he added.

SAIL CRUDE OUTPUT UP

The five-integrated steel plants under the Steel Authority of India Limited (SAIL) at Bhilai, Durgapur, Rourkela, Bokaro and Burnpur registered a growth of five per cent in hot metal and six per cent in crude steel output in November over the respective levels in the corresponding month of last year, says an official release.

The production of crude steel in SAIL plants in November at 750,000 tonnes was the highest ever for the month since inception. The output of hot metal and saleable steel during the month was 827,000 tonnes and 629,000 tonnes respectively.

Bhilai steel plant produced 289,000 tonnes of hot metal, 295,000 tonnes of crude steel and 233,000 tonnes of saleable steel in November. The production of crude steel and saleable steel was the highest ever for the month of November.

The modernisation and capital repairs of blast furnace no. 6 were completed in a record time of 162 days against the scheduled 180 days. This will improve the productivity of furnace by over 20

per cent. Bokaro Steel Plant turned out the best November production since inception and produced 285,000 tonnes of hot metal, 244,000 tonnes of crude steel and 220,000 tonnes of saleable steel recording a growth of 13 per cent, 11 per cent and nine per cent respectively during the month, over that of November, 1989.

MINERALS ENGINEERING SYMPOSIUM FOCUSES ON THE 90s

MINPREP 91, the Minerals Engineering Society's second international symposium and exhibition on mineral engineering, will be held at the Dorchester Exhibition Centre U.K., from 9-14 April 1991.

'Minerals Engineering — The Challenges of the 90s, is the theme chosen for the Symposium to highlight the demands which engineers and managers are likely to face in the next decade.

Papers for MINPREP 91 have been invited in the subject areas of recent developments in minerals engineering, the expanding market place for minerals, the energy scene, minerals engineering and the environment, quality management, cost-effectiveness and education and training.

An integral part of MINPREP 91 is the Exhibition being held alongside the Symposium where suppliers to the minerals preparation and processing industry will have an opportunity to display their products and services in a venue where the facilities are also suitable for large machinery. In addition, MINPREP 91 is the only exhibition in the UK in 1991 being supported by British Coal and the Chamber of Engineers.

Further details on MINPREP 91 are available from the Minerals Engineering Society's appointed organisers, Mining Industry Promotions Ltd., 28 Church Street, Rickmansworth, Hertfordshire WD3 1DD, U.K. Tel.: 0923 778311 Fax: 0923 776820

Science Briefs

VITRO PROPAGATION OF NEEM

Uniform plantations of "neem" (*Azadirachta indica*), a tree with dense medicinal, agricultural, industrial and commercial importance, can be raised through tissue culture, recent research indicates.

Scientists from the tissue culture laboratory of the Faculty of Science, Gujarat University, Baroda, have reported successful *in vitro* propagation of *Azadirachta indica*, using small, excised leaf discs. They reported their findings in the Indian Journal of Experimental Biology.

Usually neem plants are raised through seeds, but the seeds remain viable for only two weeks after maturation. Also, trees raised through seed germination exhibit considerable variation.

In their experiments, the Baroda researchers collected healthy leaflets from superior neem trees, sterilised them thoroughly and punched small discs from them.

They cultured the discs in a special medium supplemented with various concentrations of plant growth hormones.

The excised leaf discs produced 12-15 adventitious shoot buds within four weeks. Addition of adenine sulphate had a synergistic effect and 18-20 buds were formed.

The scientists next isolated shoot buds and grew them separately on another medium, where each bud developed into a healthy shoot.

The shoots gave rise to 12-15 plantlets within six months. After acclimatisation to the natural surroundings, the

plantlets were transferred to pots, the report by K. Ramesh and M.A. Padhya says. The standardised procedure can serve well for clonal propagation of neem trees.

—PTI Science Service,
Oct. 16-31, 1990, p. 1

COMPUTER-BASED SYSTEM FOR DATA ON IRRADIATED FUEL

A computer-based system, 'Candor', has been developed for automatic acquisition, storage and analysis of data on non-destructive tests on irradiated nuclear fuels, by the electronics and radio-metallurgy divisions of the Bhabha Atomic Research Centre, Bombay.

The system, built around a small inexpensive computer, is highly flexible and hence adaptable to testing situation demands, say BARC scientists V.K. Madan and K.C. Sahoo.

The programming language used is instrumental BASIC. The system support includes disk file management for easy manipulation of data files and programmes. It also has facilities for string handling, array handling and matrix manipulation.

During post-irradiation examination (PIE) of nuclear fuel a number of non-destructive tests are carried out. Since it is time consuming and also costly to repeat a fuel irradiation experiment, large amount of data is collected during PIE, disregarding the question of immediate interest, according to Mr. Sahoo. In case of experimental fuels preirradiation measurements are made for comparing with post-irradiation measurements.

The system has been utilised for profilometry, eddy current testing and gamma scanning measurements.

—PTI Science Service,
Oct. 16-31, 1990, p. 2

MAGNESITE PROJECT YIELDS REMARKABLE RESULTS

An ambitious biotechnology project to purify magnesite ore using a bacterium has yielded remarkable results in field trials.

The five-year project, sponsored by the Department of Biotechnology (DBT) in collaboration with Burn Standard Company Limited, a Calcutta-based private firm, is expected to drastically reduce India's dependence on foreign countries for high grade magnesium.

The bacterium that is all set to transform India's magnesium scenario is *Bacillus licheniformis*. Of the 25 subgroups of this bacillus isolated scientists have found six that are of significance in purification.

Through microbial leaching, the costs are negligible and India's huge magnesium deposits could be completely utilised.

Though nearly 10 per cent of the world's magnesium deposits are found in India, most of them are unsuitable for specialised industrial processes. While 60 per cent of the deposits are found in Salem in Tamil Nadu, 30 per cent are located in Almora in Uttar Pradesh.

Field trials done so far have boosted the morale of workers on the project and if the trend continues, India may well be credited with developing a technology for the 21st century, say DBT scientists.

Though the microbial leaching process is common knowledge, no country has so far taken it up on a large scale, according to the scientists. In this sense, India is pioneering field applications in the purification of magnesium ore, they say.

The main impediment in the use of magnesium for industrial purposes is the presence of silica as contaminant. Most of the magnesium ores found in the country are contaminated with at least six per cent of silica, while some even have 20 per cent silica. The idea is to reduce the contaminants to less than one per cent. Conventionally, this has been done by processes that are cumbersome and expensive, and therefore unsuitable for large-scale use.

In microbial leaching, the contaminated magnesium ore is crushed and placed in containers. The ore is steamed to remove all superficial impurities including other kinds of bacteria that may be present. The silica, however, remains intact.

The bacterial medium is then introduced into the containers while scientists sit back to watch *Bacillus licheniformis* set to work. The bacterium proliferates and spreads all over the ore and then proceeds to attack the silica.

The silicic acid that is then formed is easily washed away. The magnesium that results has a low percentage of silica.

For a project that started in July 1989, scientists say that progress as of now is excellent. With the results that have been obtained, it is possible to straight-away mix the purified magnesium with the imported high-grade variety (silica content less than one per cent) and use it for specialised industrial purposes.

— PTI Science Service,
Oct. 16-31, 1990, p. 2

PURE "GHEE" IS ANTI-CANCEROUS

"Ghee" (clarified butter or butter oil), considered for centuries as the best source of edible fat and essential for good health and longevity, has now been confirmed by scientists as having anti-cancerous properties.

Dr. R.P. Taneja and Mr. T.N. Murthy from the Institute of Rural Management, Anand, Gujarat, have confirmed that ghee contains rich sources of anti-cancerous conjugated linoleic acids (CLA).

Ghee is made by heating butter or cream. According to the scientists, milk proteins provide hydrogen to linoleic acid during the heating process and catalyse the formation of CLAs—a process somewhat similar to the microbial enzymatic reaction in the rumens of cows and buffaloes.

The total CLA content of milk fats extracted by solvents from milk of cows and buffaloes is about 0.6 and 0.5 per cent respectively. The solvent extraction method does not involve either fermentation in the presence of butter milk or heating at high temperatures. Therefore, the CLA content is due to only the natural enzyme action in the rumen.

The Anand researchers found that microbial fermentation during the formation of curd increased the CLA content to 1 per cent. After melting butter at 110 degrees celsius by the traditional method, the CLA content was found to be 1.1 per cent in cow ghee and 1.3 per cent in buffalo ghee. When the process was carried out at 120 degrees celsius, the CLA content improved further to 2.5 and 2.8 per cent for cow and buffalo ghee respectively.

In the cream-butter method the CLA levels were 0.9-1.8 per cent in cow and 0.7-1.6 per cent in buffalo ghee made at 110 degrees and 120 degree celsius respectively. In the direct cream method it was 0.6 and 0.7 per cent only.

Repeated experiments confirmed that the traditional method of taking out butter from the curd and heating it to 120 degree celsius for making ghee was better than the methods followed in commercial dairies.

— PTI Science Service,
Oct. 16-31, 1990, p. 3

REMOTE CONTROL FISSION GAS ANALYSER

A remote controlled fission gas analyser (FGA) to characterise gaseous solid matrices has been developed by engineers at the Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam.

Qualitative and quantitative determination of gases occluded in a solid matrix is necessary for characterisation of materials used as fuels or structural components in a nuclear reactor.

An important task of the FGA is to determine quantitatively the retention functions of fission gases xenon and krypton in test material after their release from a fast breeder test reactor. The data is required to evaluate the swelling during irradiation, says IGCAR scientist, Mr. Sitaram Das.

The FGA is already in operation, C.K. Mathews, Head, Radiochemistry Programme of IGCAR, said.

Trapped gases may be present in a system, either atomically dispersed in the matrix, or as intra-granular or intergranular bubbles. Besides estimating the total quantity, scientists attempt to distinguish and estimate fractions of gas up with each type of entrapment.

"Thus a study of release rates and consequent outgassing pattern as a function of temperature and time may help in the detailed characterisation of entrapped gases," Mr. Dash said.

One simple way to determine retained gases is by thermal desorption under vacuum at elevated temperature followed by dynamic monitoring with the help of a quadrupole mass spectrometer. "We developed the prototype based on this approach and it was successfully operated", Mr. Dash said.

— PTI Science Service,
Oct. 16-31, 1990

VENT EXTRACTION OF RUTHENIUM

searchers of Jadavpur University, Kolkata, have devised a simple method to extract ruthenium, a hard, brittle, silvery white metal that is used as a catalyst.

The new solvent extraction technique overcomes many of the problems of the currently used multi-step process, and promises to be economically viable, the scientists report.

The researchers isolated ruthenium from its aqueous chloride solution, in the form of a complex with cinnamoyl-hydroxamic acid. The aqueous chloride solution was formed by dissolving ruthenium in 0.1 molar solution of hydrochloric acid.

The researchers next treated the extracted aqueous solution with cinnamoyl-hydroxamic acid to obtain an organic extract. Their experiments revealed that ruthenium extraction is independent of chloride ion concentration.

— PTI Science Service,
Oct. 16-31, 1990, p. 4

ADVANCED PETROLEUM EXTRACTION PROCESS

Australian petroleum industry scientists have made a significant advance in technology for extraction of oil from ageing wells.

They have devised a process that uses bacteria already existing in oil wells. The life cycle of the bacteria produces a natural detergent that frees oil from the spaces between earth particles so that it can flow freely out of the well. When water is pumped in to provide pressure.

In the past, gas or water treated with chemical surfactants have been pumped into wells to try to extract oil when the natural gusher has faded away.

Although this does enable the extraction of some oil, it still leaves much in the ground which, in the past, it has not been possible to recover.

Oil seldom exists in pure form as a vast lake under the ground. Even in situations where there is an initial gusher, the pressure will quickly drop so low that it needs to be pushed out.

Sand and rock hold oil grains between them rather like a sponge holds water. When the sponge stops dripping water there is still a lot of water left in it but it needs to be squeezed out.

On a global average, production from an oil reservoir usually ceases when only 30 per cent of the oil has been brought to the surface. The figure can vary from well to well depending on geology.

In the past, it often has been uneconomical to force out oil with the known technology. In addition, the surfactants used in the past are minimally biodegradable and can pose environmental hazards in the long run.

However, the bacterial surfactant developed by the Australian researchers based in Canberra have been dramatically successful in trials on Queensland's Alton field. The trial was able to boost production by about 50 per cent for a year with no end in sight to the increased flow.

The breakthrough follows 10 years of research in the area. The researchers injected the Alton oilfield well with a solution enriched with natural bacteria extracted from the oil reservoir. The technique extracts bacteria, provides them with nutrients so that they will grow and multiply and then returns them to the oil bearing rocks far below the surface.

A patented injection and dispersal system is used to introduce small quantities of the chosen micro-organisms

into an oil reservoir.

—PTI Science Service,
Oct. 16-31, 1990, p. 13

INNOVATIVE TECHNOLOGY BY INDUSTRIAL PIPE MAKER

A South Australian pipe-making company that has already made innovative advances in PVC pipe technology is conducting research into another form of reinforced PVC which may have a significant impact on the international scene.

The new concept is a spirally wound ribbed PVC pipe reinforced with steel strip. The pipe may have wide application in areas using gravity flow pipes such as stormwater drainage and culverts.

The company which is developing the new pipes is Rib Loc Group Limited, a listed public company, located in Adelaide. The pipe called 'Rib Loc' is formed by extruding PVC in a continuous sheet about two metres wide with reinforcing rib on the external surface, a smooth inner surface and male and female grooves along the two sides which formed a mechanical locking device.

The company had developed a series of machines which wound the PVC into a pipe, inserting adhesive into each edge locking device. The pipe exits the machine in a continuous length. The machines could be taken to a work site where they could form a completed pipe for a distance of up to about 100 metres, depending on pipe diameter.

They can produce piping from 100 mm to two metres diameter. The fact that pipes up to 200 mm in diameter can be formed in lengths up to 100 metres makes them ideal for repairing broken pipes at relatively low cost. They can be expanded *in situ* to fit inside the old pipe. The company is developing the product further by incorporating a facility to include a rust-resistant metal strip

which fits snugly between the external ribbing.

The original ribbed locking pipe, developed in the early 1980s, is marketed around the world. It is taking over from spirally wound cardboard or steel pipes, and is competing with concrete pipe.

The spirally wound PVC pipe is lighter and more durable than spirally wound cardboard and steel tubes. It is easier to use on site and easier to strip from the concrete column after setting. One of the potential uses for the steel reinforced pipe is creating voids or channels in reinforced concrete structures.

The addition of the steel band will double the strength of a PVC-ribbed spirally wound pipe. There are some interesting geomechanics applying to pipe technology. For example, when flexible pipes were properly installed in trenches with compacted soil backfill, the pipe deflected under load and interacted with the soil arch.

The resulted pipe-soil system was very strong and in theory, once the soil arch was formed, the pipe itself could be removed leaving a channel of almost undiminished strength.

This meant that lightweight PVC pipes could be used as culvert pipes under roadways at suitable depth, as the pipe and soil system had the same strength as concrete piping.

— *PTI Science Service*,
Oct. 16-31, 1990, p. 14

PROCESS TO POLYMERISE COMPOSITE MATERIALS

A new process developed by the French company, Aerospatiale, does not use heat for the polymerisation of composite materials. The composite part is scanned by an electron beam, causing an immediate interaction between the radiation and the material, whereupon

polymerization takes place with no rise in temperature.

Ionisation has apparently never yet been used for material processing, the "French Technology Survey" said. The process is based on research in molecular chemistry. The energy of the electron or x-ray beams breaks the fragile bonds and releases the chemical radicals which then recombine causing polymerization.

This technique is claimed to have many advantages in industry. One of them is in time-saving. A jet engine with a "wound round" structure, necessitating polymerisation for several days, will be ready in a few hours since, with ionizing beams, the action on the resin is immediate.

The result is lower cost, and the technique is very flexible to apply: repolymerization and local polymerization is also possible. The lack of any rise in temperature means that there is virtually no expansion of metal components. Metal inserts can be incorporated and the dimensional quality of parts is perfect from the outset.

The complex built by Aerospatiale following the successful polymerization by the above method consists of a 20 kW electron accelerator capable of polymerizing carbon composites up to a thickness of 32 cm, a compartment for polymerization of parts four metres and 10 metres long and a programmable automatic system to pass the entire surface of the components in front of the accelerator in an appropriate manner.

— *PTI Science Service*,
Oct. 16-31, 1990, p. 16

PRODUCTION OF STRUCTURED FOAMS

The demand for buoyancy materials suitable for use at great depths under water and hence combining lightness with compression resistance has catalysed the French Petroleum Institute to

develop the production of structured foams.

Structured foams, which can remain buoyant virtually permanently, down to water depths of 5000 metres, are distributed in the form of modules or tubes along submerged pipes. In this way, the "French Technology Survey" said, the foams constitute a sort of buoyancy harness, the volume of which is calculated to give the piping system a virtually zero apparent weight in water regardless of depth.

A structured foam is a multi-cellular composite material obtained by adding specially shaped cells to a basic binder. This is done by incorporating hollow spherical particles (microbeads of glass and micro-beads of reinforced resin) in a thermosetting resin. The resin material, once hardened, must be sufficiently rigid and strong to protect the hollow particles and prevent them from being crushed or imploding under pressure.

Since the ultimate use of these materials involves long immersion under substantial hydrostatic pressure, two other important properties are their resistance to hydrolysis and water absorption under the pressure of the resin, in order to guarantee a long life for these composite materials.

Prior calculations were done of the correlations between the rate of water absorption at different pressures and the chemical nature of the resin or the quality of the interface between the resin and the hollow particles. This has led to the formulation of a new resin, specially adapted for the production of structured foams.

This resin has numerous advantages (low viscosity, low water absorption and low density) compared with the epoxy resins so far used for this kind of application.

— *PTI Science Service*,
Oct. 16-31, 1990, p. 17

New Products

OSCOPIC DIAMONDS FOR INDUSTRIAL USE

Kay Industrial Diamond Corporation, USA, has been the forerunner in the world of "Microscopic Diamonds" for 40 years and produces the very finest microscopic diamonds with great precision to meet the changing needs of various industries dictate.

'SJK-5' microscopic diamond with a strong, whole monocrystalline type crystal offers the ultimate in tensile strength. The SJK-5 crystals extremely efficient metal bond with extra strength and resistance to breakdown at high temperature is recommended for the toughest bond applications where more cutting action is required, enhanced better finish. It is available in 64 individual microscopic grades.

'RJK-1', a new product for the industry has been designed for application in bonded wheels and where a soft grinding and lapping action is required.

The Kay 'Natural Diamond' with its unique physical and chemical characteristics and guaranteed purity is available in various microscopic grades. The 'Natural diamond' has a strong, blocky, angular shaped particle with smooth surfaces & sharp edges. In abrasive tests and Knoop indentation tests, the natural diamond particle is measured at 10 on Mohs scale. It is an excellent insulator with graphitisation at 600°C in air.

Kay Industrial also manufactures a complete spectrum of other microscopic diamonds and several innovative products such as a 'Liquid Diamond Slurry', Electro-plated Nickel/Copper micro diamonds, Synthetic diamond abrasive slurries, etc. All 'Kay' products are of consistently high quality with very exacting standards to

For further information contact: M/s. Nikunj Eximp Enterprises Pvt. Ltd., Sri Joravar Bhavan, 93, Maharshi Karve Road, Bombay 400 020.

COMMERCIAL CARBON COMPOSITES, C³

Fiber Materials, Inc. (FMI), a world leader in the development and fabrication of advanced carbon-carbon composites, has developed a new low cost carbon composite product line, 'C³' for industrial applications.

'C³' is a two directional fibre reinforced composite designed to meet stringent structural and high temperature requirements. 'C³' possesses all of the classic properties of graphite and has lower density, superior mechanical properties and longer operational life. 'C³' has high resistance to thermal shock, high temperature stability upto 2000°C, low thermal expansion and low transverse thermal conductivity, corrosion resistant, high resistance to fracture, is electrically/thermally conductive and machines easily.

'C³' is used for thermal barriers and heating elements by a number of hot isostatic presses and it meets all fastener requirements in industrial applications. C³ is used for thermal barriers and heating elements by a number of hot isostatic presses and it meets all fastener requirements in industrial applications. C³ is fast replacing currently used graphite materials in heat treating/furnace manufacturing & in allied applications.

In standard form it is available in plate form or in cylindrical style in a choice of two grades (standard grade and fastener grade).

For further information contact: M/s. Nikunj Eximp Enterprises P. Ltd., Sri

Joravar Bhavan, 93, Maharshi Karve Road, Bombay - 400 020.

PROCESS CONTROL INDICATORS (METERS)

Gujarat Electrical Instruments, manufacture customised measuring instruments for process control industry. Instruments manufactured have analog indication for inputs 4-10 mA, 1-5 V and scaled 0-100% or any other customised scale. Analog instruments are shock, vibration & water resistant & can be operated from -20°C to +55°C. These instruments provide reliable performance, high quality and precision indication required in chemical process, water treatment, food and beverage processing application. Accuracy is 2% full scale.

For further information contact: M/s. Gujarat Electrical Instruments, Plot No. 624, Opp. Krankur Lab., GIDC Estate, Naroda, Phase IV, Ahmedabad 382 330.

BRIGHT CYANIDE ZINC PLATING PROCESS

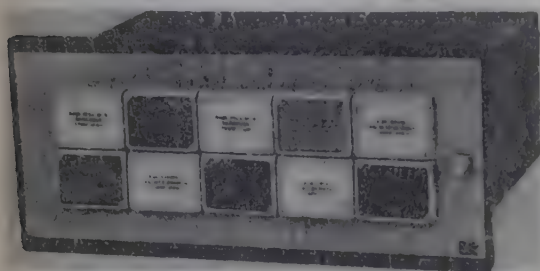
Daulat International, the pioneers of "Tinglo" Bright acid tin plating process have now introduced "ZinkGlo-CY", bright cyanide zinc plating process. The "ZinkGlo-CY" can be used for zinc plating from standard and medium cyanide based plating solutions for rack and barrel operation and it plates exceptionally bright levelled and ductile deposits with uniform covering and high throwing power. The process solution remains stable at high operating temperatures and also over longer shut down periods. The bright cyanide zinc plated parts also accept chromate treatment readily. Complete technical details of the process, bath preparations, operating method, maintenance, etc. are provided by the manufacturer.

For further information contact: M/s.

Daulat International, 167, A to Z Industrial Estate, Fergusson Road, Lower Parel, Bombay - 400 013.

ALARM ANNUNCIATORS

It is an audio-visual system used for instant warning of any abnormal condition occurring in any industrial process. Such indications enable to protect valuable systems and equipments in process, power and metallurgical plants. "Instalarm" offers the complete range of operational sequences in annunciation



system based on C-mos/TTL technology. These units are manufactured to meet any number of parameters wherever 'Change of State' can occur. All types of structures namely flush mount, split architecture, wall mount, blind unit/panel with logic, floor mounted cubicle panel, pedestal mounting and intrinsically safe annunciators for hazardous area applications are available. A hooter is provided to complete the audio-visual system. All such units can be supplied to suit any of the following input voltages 110V/230V AC - 50Hz $\pm 10\%$ and 24V/48V/50V/110V/220V/250V DC $\pm 10\%$ (AC ripple - 10% max). AC failure DC alarm or vice-versa facility can be provided, if required.

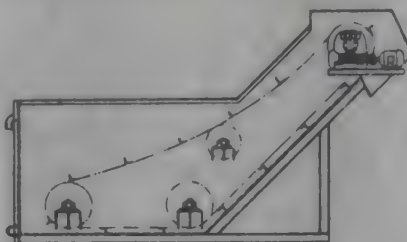
For further information contact: Instalarm Control Products, 772, Shriram Bhuvan, Tilak Road, Opp. B.E.S.T. Office, Dadar T.T., Bombay - 400 014.

SLUDGE CONVEYOR

Indiana's Sludge conveyors are designed to remove heavy organic solids from industrial slurry/wastes. They are generally used in fertilizer, chemical, iron and steel, thermal power plants (ash removal/extraction), sewage

treatment, engineering and various other industries.

The equipment consists of a specially designed tank with scrappers mounted between heavy duty continuous chains. The tank is provide with a specially designed sealing arrangement to prevent leakage. The tank is suitably designed so that the inclined portion provides access for the material to be discharged at any convenient height.



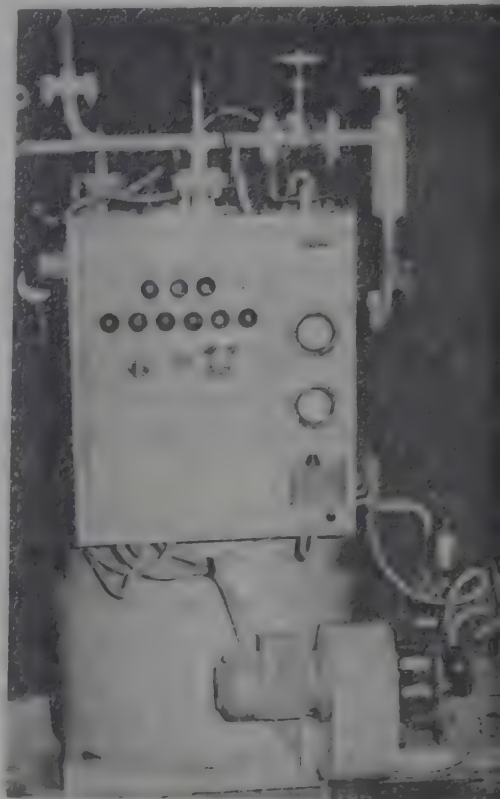
The liquid along with heavy inorganic solids is first allowed to settle down for a calculated period of time, but in some cases if the solids are very heavy it can operate continuously. The settling time varies for different materials depending on their characteristics. After the heavy solids settle down, the conveyor is started. The scrappers, scrap the material settled at the bottom of the tank, which is effectively discharged. In case of very sticky material special cleaning arrangement is provided at the discharge. The complete operating cycle can be made automatic by introducing a timer device, i.e. after a calibrated time, the conveyor will automatically start and stop.

For further information ~ M/s. Indiana Engineering Works (Bombay) Pvt. Ltd., 12, Hingorani House, Dr. Annie Besant Road, Worli, Bombay - 400 018.

"THERMOMET" FUEL EFFICIENT BOILER

"Thermomet" Fuel Efficient Boiler is a unique high pressure, forced draft, forced circulation, water tube package, non-IBR coil type, fully automatic, oil fired boiler which gives high quantity of steam at a lower fuel cost per kg of steam. It's high efficiency is because of

compact three pass design and perfect combustion with pressure jet burners of suitable capacity.



"Thermomet" boiler is designed in such a way that it requires minimum space & can be installed and commissioned within two hours. "Thermomet" boilers cater to the need of various food chemical, pharmaceutical, rubber laminate industries etc.

For further information contact: M/s. Thermopac Boilers, 1, Dharam Palam Shantivan, Near National Park, Borivli (East), Bombay 400 066.

BLOW MOULDING MACHINE

Polymechplast offers a broad range of blow moulding machines to serve the needs of the plastic industry. The machines are based on advanced know-how and are noted for their performance, productivity and operational economy. Features incorporated are Parison programmer to provide even parison thickness throughout the length of the die, DC with thyristor control screw drive provides adequate screw speed, double head to obtain high production, bottom blowing facility to suit small articles in top-bottom cavity moulding, selection in separate heads for PVC and HDPE or common head and choice of

atic or hydraulic operation
es.

for further information ~ M/s. Pol-
ast Machines Pvt. Ltd., 775,
Makerpura, Vadodara 390 010.

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the MET-3001 is a compact, accurate and
e turbidity transmitter. It is oper-
y means of push button key board,
digital display and a user-friendly
which is available in most Euro-
anguages. All parameters, such as
ing range, alarm limits/contacts,
t range, smoothing etc. are fully
amenable.

Multiplexing

the MET-3001 Turbidity Transmitt-
capable of simultaneous and inde-
pendent multiplexing of a number of
inputs. The operator is informed
times of the simultaneous opera-
of many steps in one process using
ame instrument, or can operate a
er of independent processes.

ors

vo different sensors cover a very
variety of applications.

Insertion sensor WP-301

the WP-301 is used mainly in the
cipal and industrial waste water

treatment and water preparation plants.
The unique design of emitter and detec-
tor in one plane makes it possible to
install the probe as a dip (immersion)
probe for use in channels, outfalls etc.
or as an insertion probe mounted in a
plastic Y piece.

The WP-301 is equipped with a
mechanical cleaning device, a pream-
plified and daylight filter, and uses IR
scattered light measurement according
to the ISO 7027 standard.

Operating ranges with WP301:
0-3...0-20 in 1 NTU/FTU steps, 0-50,
0-100, 0-200, 0-500 and 0-1000
NTU/FTU.

Insertion Sensor PP-301

The PP-301 is designed for use in
closed pipes and vessels, etc., found in
industrial applications and processes. It
has been designed for high temperature,
high pressure, high alkalinity or acidity
and solvent use in such processes as
fermenters, reactors, bio-reactors etc. It
is manufactured in stainless steel and
can be steam cleaned (C.I.P.).

The probe operates by IR-backscat-
tered radiation. The radiation is trans-
mitted along fibre optic cables from the
emitter and to the detector. The detected
signal is converted to an electrical
impulse and transmitted to the electronic
unit of the instrument. The operating
ranges of the PP-301 are: 0-10-0-20

FTU/NTU (in 1 FTU/NTU steps) and
0-50, 0-100, 0-200, 0-500, 0-1000 and
0-4000 FTU/NTU.

For further information contact: BTG
Kalle Inventing AB, P.O. Box 96, S-
661 00 Saffle, Sweden.

SELF-DRIVEN MIXER DEVELOPED

Adding to the undoubted success of
its novel mixing system, the Cavity
Transfer Mixer (CTM), built for the
extrusion industry, Rapra Technology
Limited, the British research and devel-
opment company specialising in plastics
and rubbers has now produced a versa-
tile self-driven version, suitable for
smaller machines and for experimental
testing and proving of mixes.

The self-driven CTM takes its main
polymer feed from a conventional
extruder (up to 30 mm screw diameter),
operates at similar or higher rotational
speeds (driven through its own 1.5 kW
DC motor), and can handle a wide range
of distributive mixing tasks.

It can be used for masterbatching,
polymer blending, and homogenising.
Fibres may be incorporated through an
addition port, and liquids (such as tack-
ifiers, colours and accelerators) can be
injected directly ahead of the CTM and
die head. Varying the speed of the unit
also allows optimum mixing levels to
be selected (at high rotational speeds,
high levels of liquid additives are pos-
sible, producing flexible compounds
such as sealants and adhesives). By
using two separate feed extruders, pol-
ymers requiring completely different
processing conditions can be blended
together.

The system is mobile, height adjust-
able, and is available with various modi-
fications to suit customer requirements.

For further information contact: Dr.
Martin Gale, Rapra Technology Lim-
ited, Shawbury, Shrewsbury, Shroph-
shire, SY4 4NR, England.



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STANNOUS (TIN) CHLORIDE
STANNIC (TIN) CHLORIDE
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Highlights in Chemical Technology (Part 2)

NEW FINNISH PROCESS FOR GAS DESULFURIZATION

The Finnish Company Tampella (Tampere, Finland), is installing a demonstration unit of its new Lifac gas desulfurization plant at the Sarnar river thermal station owned by Sarnar Power in Canada. In the Lifac process, powdered limestone is heated into the upper portion of the gas furnace to produce calcium oxide. This then reacts with sulfur dioxide in the flue gas to form a calcium sulfate sludge that is easily separated from the gas.

Tampella claims Lifac is cheaper to install than scrubbers and is readily adaptable to any type of boiler. If the demonstration unit is successful, Sarnar Power will install Lifac in its Sarnar thermal plant. (*ECN*, 9/24/90, p. 10).

SOLAR CAR BASED ON HIGH EFFICIENCY PHOTO VOLTAIC CELLS DEVELOPED IN JAPAN

A new solar car called 'Phoebus-3' developed in Japan will be the star attraction in the 'World Solar Challenge-90' a 3000 km race for solar-powered vehicle across Australia from Darwin to Adelaide. Developed by Sanyo Corporation (Japan), the car has two wheels in the front and one in the rear and weighs only 150 kg. The heart of the car delivering power is the system of photovoltaic cells which convert solar energy into electricity with an efficiency of 19.3%, the most efficient in the market today. The photovoltaic cells deliver a total electrical power of 1.4 kilowatts to a compact high performance direct-current motor that drives the car. This novel three-phase brushless motor using rare earth magnets weighs only 1.5 kg. The high efficiency photovoltaic cells were developed by the Japanese firm under

the Japanese government sponsored 'Sunshine Project'. In the near future, the firm plans to mass produce their cells with convertible efficiency better than 20 per cent or double the efficiency of current photovoltaics.

According to reports from the company solar-powered cars will be the first major application of these new cells, while domestic lighting will be the next. A total of 43 teams from 10 countries will compete in the race. The last such race held in 1987 was won by the General Motors Corporation of USA. (*TOINS*, 10/19/90, p. 13).

FUEL CELLS COMMERCIALIZATION ON THE NEAR HORIZON IN USA

A 100 kw solid oxide fuel cell, the largest of its kind to date, will be built by Westinghouse Electric Corp. (Pittsburgh, Pa) for Southern California Gas Co. (SCG, Los Angeles). Fuel cells have high overall efficiency (around 80 per cent for solid units) and are non-polluting. They transform reformed natural gas directly to electricity, rather than via combustion. The unit, due for delivery around the end of 1991, will undergo a year of tests, and then be installed in a new housing project. The \$ 7 million development is mostly funded by the US Dept. of Energy with SCG contributing about \$ 1.67 million and the California Energy Commission (Sacramento) \$ 500,000. In a similar project, Pacific Gas & Electric Co. (San Francisco) is to start testing a 100 kw molten carbonate fuel cell by the year end. (*Chem Eng.*, Aug. 1989, p. 48) (*Chem Eng.*, Sept. 1990, p. 25).

NON-CHLORINE PULP BLEACHING ON THE WAY TO COMMERCIALIZATION

The successful results of a process developed by Eka Nobel AB (Surte, Sweden), has taken non-chlorine pulp

bleaching a step further. The method, named Lignox, eliminates all elemental chlorine gas use and limits chlorinated organics to less than 0.5 kg/tonne of pulp. Current levels are more than 1.5 kg/tonne. The process which is said not to require major new capital investments, substitutes a proprietary chelating agent for the initial chlorine-chlorine dioxide stage, thereby allowing an increased hydrogen peroxide charge during the following lignin extraction.

Brightness levels of 70-75 per cent ISO allow a minimized secondary bleaching with carbon dioxide.

Eka Nobel claims that pulp quality is similar to that produced by conventional gaseous chlorine methods. (*Chem Eng.*, 9/1990, p. 21).

MITSUI TOATSU CHEMICALS MARKETS A NEW PROPRIETARY NUCLEATING AGENT FOR PRODUCING TRANSPARENT POLYPROPYLENE

Mitsui Toatsu Chemicals Inc. (Japan) has begun commercial production of a high performance proprietary nucleating agent (trade name NC-4) at its Ohmuta factory.

The new agent is capable of making polypropylene (PP) transparent while retaining the weather/heat resistance of the base resin. When added to the resin only in small quantities the agent can produce the desired effect, since it has a higher classification ratio than conventional products do. It has such good compatibility with PP that it hardly bleeds from the resin when the latter is put into moulding processes.

In addition, the new agent serves to improve the synthetic resin's strength, elasticity and dimensional stability. The resin produced using the new nucleating agent had resistance against x rays and is therefore suitable for injection

and plastic cases, both of which are subject to radiation sterilization. The demand for transparent PP resin tolerating radiation is increasing worldwide in response to energetic moves towards preventing AIDS. Polyethylene resin is unsuitable for radiation sterilisation.

In Japan NC-4 has been already approved as an additive to raw material for food containers, packaging material by Japan's Hygienic Olefin & Styrene Plastics Association. In August 1988, the product was formally registered with USA's Food Drug Administration. Potential applications of NC-4 added transparent PP as containers for food, beverage and cosmetics, clothing cases, detergent bottles, disposable injectors, intravenous drip-bags, video cassettes', etc. (*Japan Chem Wk.*, 5/10/90, p. 1).

GRAPHITE DIRECTLY TRANSFORMED INTO B-SILICON CARBIDE

Toyo Tanso Co. (Japan) has developed a technology for transforming graphite material into ultra high purity B-silicon carbide. The company intends to supply B-silicon carbide to jigs for a silicon carbide based diffusion furnace. Employing the new technology, the company controlled the particle size of the graphite material, formed micropores on the surface and inside isotropic graphite produced from the graphite particles and converted the resultant product into B-silicon carbide at a high temperature. The product is impregnated with silicon or coated with silicon using a CVD process.

The two types of products obtained have high thermal conductivity and the CVD type one in particular has strong acid corrosion resistance. Their basic properties are:

Bulk Sp-gravity 3.0

Bending strength 220 mega pascals

Thermal conductivity 48 (100 kg) W/mk.

Vickers Hardness 2600 Hv (100)

Iron 1.9 ppm
Nickel 0.4 ppm
Chromium 0.009 ppm

The company has established technology for forming flat CVD film on the uneven surfaces of target materials. It facilitates production of jigs of complicated shape.

Baking temperature within a diffusion furnace designed to form oxide film upon silicon wafers is able to react 1,300°C along with the increase in the diameter of silicon wafers. In a related development raw material for the furnace is being switched from quartz to silicon carbide.

Conventional type silicon carbide however, contains sintering auxiliaries as impurities and its workability and dimensional stability have not reached a satisfactory level. (*Japan Chem Wk.*, 7/12/90, pp. 5, 8).

PHENOL PRODUCED FROM BENZENE IN A SINGLE STEP FUEL CELL REACTION

Researchers at the College of Engineering, Tokyo Institute of Technology (Japan) have produced phenol from benzene in a single step using active oxygen obtained from oxygen hydrogen fuel cell. The benzene was completely converted to phenol, with the fuel cell supplying electric power without producing carbon dioxide.

The researchers employed as a diaphragm, a glass wool disk containing phosphoric acid and used graphite carrying metal chlorides as a cathode. Subsequently, they introduced hydrogen into an anode chamber, added pure benzene in a cathode chamber, blew oxygen into the latter chamber, while agitating the benzene and short circuited the electrodes used. In this manner, phenol was produced from benzene during the reaction of the fuel cell. They report that combination of samarium chloride and graphite produced the cathode having

the highest activity.

As result of this breakthrough seems possible to apply the phenol production process to other of oxidation reaction. The research group claims that it may facilitate partial oxidation of cyclohexane, which reported to be difficult when conventional methods are employed. Phenol is usually produced using benzene oxidation, cumene oxidation and hexane processes, all of which are ever, complicated and produce considerable by-products. To date, producers worldwide have been looking for development of a simple process aimed at synthesizing phenol in a single step. (*Japan Chem Wk.*, 4/19/90, p. 8).

DU PONT (USA) UNVEILS A NEW ROUTE TO TETRAHYDROFURAN FROM N-BUTANE

Du Pont Co. (Wilmington, Delaware, USA) has completed two multi-million dollar pilot plants to demonstrate the step production of tetrahydrofuran (THF) from n-butane. This follows on the firm's introduction two decades back of an acetylene formaldehyde route that in its turn, replaced a furfural process. Commercialization is scheduled in Europe in 1994.

The new method begins with partial oxidation of n-butane to maleic anhydride, followed by hydrogenation of aqueous maleic acid to THF. Butane oxidation catalyst with low attrition resistance is the key to the first stage providing long term stability for maleic anhydride and permitting the recycle of unreacted butane. The hydrogenation process directly converts aqueous maleic acid to THF circumventing several disadvantages of traditional routes including the isolation of molten maleic anhydride, and the intermediate butanediol in esterification steps of organic solvents. (*Chem Eng.*, 3/1989, p. 37), (*Chem Eng.*, 10/1990, p. 17).

ON-LINE INFRA-RED PROBE MAKES A DEBUT IN USA

First full-scale chemical process ever employing an infra-red sensor has been installed at a Du Pont chemical plant by the unit's manufacturer, Axiom Analytical Inc. (Irvine, California).

The probe enables users to collect in real time the mid-infrared spectra of chemical groups that control a reaction, thereby providing a window into the process. 'For most processes, a system like this will pay itself, the first time it prevents a batch from going bad'. The probe is 8 ft. long and 3 1/2 ft. in diameter and its lower end has an internal fibre-optic sending element that dips into the process fluid.

The upper end is connected by a series of light guides to a Fourier Transform infra-red spectrometer. The operation of the probe is based on the attenuated total reflection technique commonly used in laboratory analysis, which measures the degree to which a focused infrared beam is absorbed by the process stream.

In practice, the system collects and averages a complete mid-infrared spectrum typically once every 30 sec. Standard multi-component analysis then plots concentrations of each constituent. (*Chem Eng.*, 10/1990, p. 25).

ASAHI GLASS CO. (JAPAN) UNVEILS A NEW MEMBRANE-CELL ELECTROLYZER

Asahi Glass Co. (Tokyo, Japan) gave details of a new membrane-cell electrolyzer that can directly produce 50 wt % caustic soda from brine, at a Global Chlorine Alkali Symposium held on Sept. 11-12 by the Chlorine Institute at Washington DC.

Existing membrane systems are limited to about 35 wt % of caustic, because

operation above this level produces a stagnant layer of hydrogen on the membrane's surface and decreases the cell's current efficiency.

To prevent this, Asahi adds a proprietary layer to the cathode side of the new membrane FX-50 and mates it with two of its "zero-gap" electrolyzers. Total energy consumption is the same or less than that for 35 wt % output combined with steam evaporation to the 50 wt % product sold on the market. Further, caustic purity is better — only 10 ppm sodium chloride, rather than 15-30 ppm with other systems. Asahi has successfully tested the system at its Kashima plant, and expects to commercialize it in 1991. (*Chem Eng.*, 10/1990, p. 19).

TEXACO UNVEILS PRODUCTION OF SURFACTANTS FROM LIGNIN

Texaco research team reports they have found a way to make suitable sur-

factants out of lignin, a waste product from pulp and paper manufacture.

Texaco reports that catalytic reduction of lignins with carbon monoxide yields lignin phenols which can then be converted to surfactants by reaction with sulfur trioxide.

These surfactants were effective in lab tests on different models of oil reservoirs.

According to authorities at Texaco, chemical flooding technology could effectively add up to 150,000 M barrels of oil to US oil reserves alone.

Lignin is not only cheap and abundant but is derived from a renewable non-petroleum resource.

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of surfactants from lignin will boost oil production in a big way. This is done by flooding the underground reservoirs of oils with surfactant solutions and pump the resulting emulsion to the surface and thereby get more oil. (*Chem & Ind.*, 10/1/90, p. 589).

IMPROVED METAL MATRIX COMPOSITES PRODUCED UNDER MICROGRAVITY

American researchers at NASA and Mass. Inst. of Technology are trying to make improved metal matrix under microgravity.

If successful the breakthrough could enable aerospace engineers to use less dense materials in aeroengine turbine blades and so reduce the fuel consumption of jets.

The research team has been making samples of nickel aluminide reinforced with ceramic particles of silicon carbide,

aluminium oxide and calcia stabilised zirconia.

They have found that in samples prepared under microgravity, the particles are more evenly distributed in the metal and that the composites are significantly harder than similar ones made on earth. They are less dense than the super alloys now used in turbine blades and also resist oxidation better.

It would not be feasible to make turbine blades in space, however, the microstructural lessons learned in microgravity will allow earth-based methods to be developed for making such components out of these novel composites. (*Chem & Eng.*, 10/1/90, p. 588).

ICI UNVEILS A NEW CERAMIC METHOD TO MAKE CERAMIC LESS BRITTLE

Scientists at ICI Advanced Materials

(Runcom, UK) have recently unveiled a simple technique to make ceramics less brittle and are now looking for end-user partners to develop products.

Because the new method is cheaper and faster than conventional techniques it will attract interest from the automobile and non-military aerospace industries.

Use of ceramics as structural materials is limited by this brittleness. ICI tackled this problem by introducing weak interfaces within the material to deflect any growing cracks.

In the process, patented by ICI, silicon carbide powder is made into sheets coated with graphite to give weak interfaces.

The sheets are then pressed together and sintered without pressure. The essential point is that the interface between the sheets is weak enough to deflect cracks and thus increase resistance to fractures.

With normal ceramics a crack goes straight across a sample and fractures completely.

With these materials the crack is deflected when it reaches the interface. Tough ceramics are currently produced using a technique called chemical vapour infiltration.

This complex method can take several months, and success is not guaranteed. ICI claims its new method to produce tough ceramics at almost a-fiftieth the cost.

Tests with the interfaced materials show the fracture toughness is 15-times greater than conventional ceramics.

Moreover, ICI adds, the technique can be used to produce other ceramics such as zirconia. (*Chem Wk.*, 10/1/90, p. 21).

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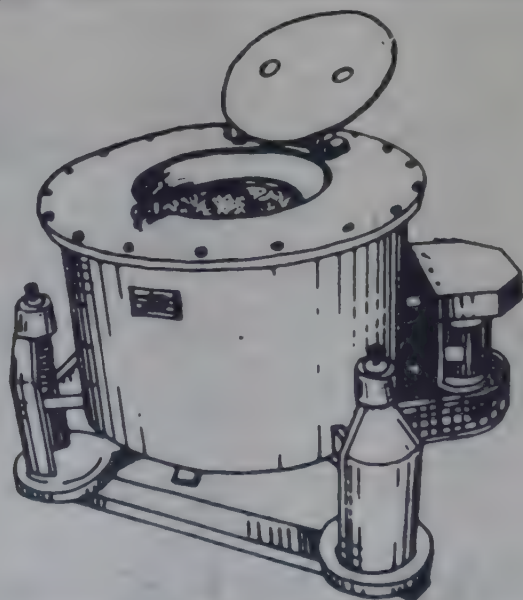
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 from toluene; p-chlorophenol, 2,4-di-
 chlorophenol and 2,4,6-trichlorophenol
 all from phenol; p-nitrochlorobenzene
 from monochlorobenzene etc.

In many such and other products
 strong demand for one stereo-isomer
 over others should act as a spur to deve-
 lopment of regio-selective catalysis. The
 book, the first by the author is divided
 into 15 chapters: Chapters 1-5, cover the
 topic of chlorination of a number of feed-
 stocks; typically benzene, toluene, acetic
 acid, phenol and other inorganics such
 as zinc chloride, copper chloride etc.

Chapter 6 covers catalysts for nitra-
 tion of organic chemicals and discusses
 in detail the amounts of various isomers
 obtained in the nitration of toluene using
 various catalyst systems. Chapters 7-12,
 deal with the manufacture of specific

chemicals such as dichlone, 2,6-di-
 chloro-4-nitroaniline, 3,4,5-trimethoxy-
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 acid, trimethoprim, and oxalic acid.

Of particular interest is the chapter
 relating to oxalic acid, the manufacture
 of which is particularly attractive for a
 country like India, endowed with a size-
 able sugarcane crop, and a well estab-
 lished alcohol-based chemical industry.
 Chapter 13 covers esterification cata-
 lysts and notes that while sulphuric acid
 appears to be only slightly more than
 half as effective as hydrochloric acid, it
 may cause dehydration of alcohol if
 used in too great an amount or at too
 high a temperature.

Chapters 14 and 15 cover catalysts
 for chlorination of nitrobenzene and for
 manufacture of chloranil respectively.
 The book is a useful starting point for
 delving into the literature in this vast
 field and the author's note that this is
 the first in a series of books, gives some-
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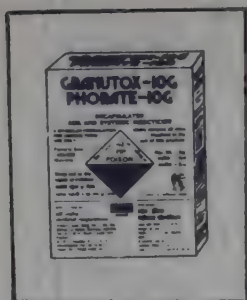
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PRODUCTION MANAGEMENT

Part-II — Introduction (Continued)

N.R.PAI

Leadership Aspects (Continued)

Providing juniors with healthy environment:

Healthy work climate helps a lot in achieving management goals. Leader has to see that the personnel he recruits are compatible in nature. They should be able to get along with their superiors, peers and subordinates. Otherwise the leader has to spend/waste most of his valuable time in settling disputes, which is certainly detrimental to the growth, working and the very existence of the organisation. Again disputes set in unhealthy atmosphere in the organisation.

Further candidates selected while recruiting should be capable of meeting their job requirements. Otherwise, as has been observed the tendency is to dabble with others work unnecessarily. It results in a person not working by himself nor allowing others to do their duties. When any employee is able to meet his job requirements well, the chances of his maintaining amicable relations with superiors and subordinates are much enhanced. It reduces organisational friction and steps up employee output. Another aspect of providing healthy employee environment is to provide subordinates with good working conditions which chiefly includes adequate employee facilities. Leader, now a days is even expected to take genuine interest in each subordinates personal well-being, if he wants to be a success. He has also to cement well his subordinates. Such an achievement on the part of the leader leads to an excellent team work and an excellent team work means excellent results.

Furnishing creative ideas:

This is the most important duty of the leader. In these days of fast shifting technologies, leader must often come out with novel creative and workable ideas to keep his company floating and flourishing. An organisation devoid of creative ideas cannot expect itself to be in the forefront of the industrial world. Novel ideas are the outcome of creative thinking which in its turn is an outcome of inspiration coupled with applied intelligence.

A leader with creative thinking is expected to be dissatisfied with everything that is existing in his organisation. He must just be out to explore the possibilities of creating better and cheaper products more efficient and effective procedures of working, shortening time of manufacture and employing cheaper and indigenous raw materials in place of imported ones, wherever possible. And all this must be done without affecting the final quality of the end product/s. In big industrial houses this job idea production is often assigned to Research and Development wing of an organisation, which

is staffed with well-qualified and experienced research personnel. Even then, the final responsibility of producing novel ideas lies with the leader. He cannot evade it.

Generally any creative thinker starts his job by going through all that is existing and known, about the products, processes, methods etc. He accumulates facts and weighs them against cost. He then applies logical reasoning to arrive at better/cheaper product, more efficient less costly methods etc. Many mental faculties are involved in the process of innovation which definitely includes mental speculation, logical reasoning, creative imagination and last but not the least intuition too. It is said more one thinks of a problem in all its aspects from all its angles more and more ideas pour into one's mind. To solve a problem, one has to get identified with it. Human mind is always capable of producing new ideas, only one has to train it to arrive at logical conclusions.

After creating and arriving at a new idea the first thing a leader has to do is to convince all the organisational concerned persons about its implementation. This includes his superior (if any), peers as also the subordinates. In other words he "sells" his ideas to the other concerned personnel of his organisation.

It has been observed that man is averse to a change and the resistance to the change is often met with from old employees who generally feel "all that they have been doing so far is perfectly o.k. and that there is no need of any change whatsoever". The best way to get them around is to show them in terms of concrete figures "how much the company will benefit by implementing the new idea". That's the best way to convince, since it is very difficult to go against figures. This winning over is necessary because their whole-hearted cooperation is needed in implementing new ideas.

After the organisational personnel are won over, the next role is to convince wholesalers, retailers and through them finally the consumer himself. This is also achieved by advertising through different media, emphasising thereat, the advantages of the new product over the existing one of its kind.

This task of creating new ideas and then getting "O.K.," for them is the chief duty of a top executive. It is this aspect which keeps the organisation above its competitors. The leader should therefore be always on a look out for new ideas, novel procedures, cheaper and better substitutes for existing products and more efficient services to the customer.

To-day any industrialist for that matter, faces challenges from the world, especially from his competitors, and that too, all the time. If he fails to meet them successfully, his firm stands no future in this competitive era. On the contrary, if he comes out with workable new creative ideas every now and then, his will be a growing firm, ahead of his competitors, with respect to time, progressing dynamically with full life in it.

Enhancing subordinate capabilities

This is also known as personnel development. It aims at stepping up the capabilities of organisational personnel to the highest possible extent. When employees working in an organisation, fully develop their abilities, they as well as the organisation are benefitted.

In authority delegation, routine work of superiors is entrusted to the subordinates. They then get well acquainted with these tasks in course of time and also get involved in the connected decision making process. They are thus slowly developed to take up responsibilities of their superiors, thereby rendering internal promotions in an organisation meaningful and effective.

The principal aims of executive development can be enlisted as follows:

- (a) Enhancing performance of the regular jobs assigned to them.
- (b) Taking up in addition to (a) above, routine tasks of the superiors, thereby setting the bosses free to look after more important executive tasks. The bosses in their turn can then take up the routine tasks of their superiors. This is called "job enlargement" in management terms.
- (c) Job enlargement as cited above renders an executive fit for promotion to his superior's post. This makes the promotion within an organisation truly feasible, thereby giving employees enough opportunities to rise in an organisation. This policy on the part of a firm, reduces personnel turnover of the company to a bare minimum. When there are sufficient chances to rise, hardly anybody thinks in terms of a change in job. On the same lines leader achieves the goal of developing supervisory personnel. Their performance of jobs at hand is improved and by way of job enlargement their capabilities are raised. This naturally makes them (superiors) worthy of promotion to the junior management cadre.

Here there is one point to note. Supervisory cadre forms an important link between management staff and workers, and keeping this cadre happy is conducive to the working and growth of an organisation. In fact, supervisors represent workers to the management and management while dealing with workers. Most of the workers' disputes can be solved with the help of this cadre. Even the workers cadre can be developed this way. The aims here are to step up individual

output, to improve upon the quality of the product they handle in producing, to develop better their sense of safety towards work at hand, to generate cost consciousness amongst the (workers), to make them knowledgeable about aims, goals and policies adopted by the company (they are then in a better position to understand the companies moves and may not be carried away by the outside forces easily) and finally to make them worthy of promotion to the supervisory cadre as and when the openings arise.

Administrative aspects:

This covers the following points:

Programming and decision making:

This point in its turn includes:

- (a) Deciding about organisational aims and goals
- (b) Chalking out methods and procedures to attain these goals
- (c) Laying down standards of performance and of costs to evaluate operational success.

Recruiting, staffing and organising:

Success of an organisation largely depends upon the abilities and attitudes of persons who serve it. Hence for the chief executive it is his skill of selecting right type of personnel which decides his fate and that of his organisation. The personnel selected should be such that they vitalize the organisational structure. Qualifications, experience and abilities of individuals must tally well with their predetermined job requirements.

Subordinates at each rung of the management ladder must be clearly and precisely told about their authority at work and the corresponding responsibilities they have to shoulder.

Their areas of working and that of responsibilities should be absolutely well defined. There should be no overshadowing of authority and responsibility from any other individual, nor there should be any area which can be looked upon as "no man's land" for which nobody is responsible.

Lastly, the important aspect of organising is to provide sufficient opportunities to one's employees for promotion within the organisation. This point has already been discussed under "job enlargement". It reduces personnel turn over. It is worth noting that when an experienced person leaves a firm, along with loss of a good person the time and money spent in his training is lost. Again, a new person has to be recruited and trained up which incurs additional cost. Further no body knows how long this "new person" would stick on to the job after getting trained. Then there are further losses. Some other company perhaps that of the competitors may pick up such a trained person to their advantage. If this process keeps on repeating often, the original company becomes something like a training center. There are service bonds no doubt, but hardly they stand in the court of law. They then have only

harassment value". From all these angles it is therefore important to bring down personnel turn over if it cannot be totally prevented and offering employees sufficient opportunities to rise within the company which is the best solution known to-day. Employees rise should be in accordance with the rise of the organisation. It is then that they develop faith in the fair play of the company which in turn greatly affects their stability and fidelity towards the firm.

Activating

It involves arousing the work force for actions. Actions that are chalked out to achieve organisational goals. It thus includes:

- (a) Issuing of orders to the juniors and instructing them clearly how to carry out planned activities. Orders can be oral or in writing.
- (b) Close supervision to achieve perfect coordination of subordinates, efforts in achieving company objectives.

Exercising control:

Control is a managerial task intended to achieve planned outcome against utilisation of allotted resources. It has several points which come in quick succession. They can be enlisted as follows:

- (a) Deciding about basic standards of expected results against resources planned to be used.
- (b) Measuring meticulously actual results obtained.
- (c) Comparing actual results against planned ones.
- (d) Ascertaining deviators in "results obtained" from "results expected".
- (e) Earmarking meaningful deviations.
- (f) Finding out their causes.
- (g) Implementing immediate remedial measures, so that the next reporting period does not indicate adverse results owing to the identical causes.

Personnel fabrication of an organisation:

There is no common standard that is followed in all or even in most of the companies to design the ladder of personnel arrangement. It differs from organisation to organisation and to a great extent it depends upon the size of the firm, products it manufacture and processes it adopts. Nevertheless, an average sized manufacturing firm often goes in for the following five personnel cadres:

- (1) Top executive (2) Senior executive (3) Junior executive (4) Supervisory class and (5) Class of operators and workers.

Amifications of production activity:

That way production activity is noticed in almost every type of business; only what differs is its degree. Thus it is noticed in the field of agriculture, that of mining and of civil construction and fisheries. However, it is the manufacturing

industries which are mainly and directly concerned with the management of production activity.

It thus takes us to "what is manufacturing". In manufacturing activity raw material/s forms is changed. It generally involves carrying out of several operations in quick succession with or without the aid of machines. During this act of processing raw materials and semifinished goods are moved from place to place.

Broadly speaking manufacturing processes can be considered under five heads:

- (a) Manufacturing by raw material split up.
- (b) Manufacturing by synthetic processing
- (c) Manufacturing by way of assembling
- (d) Manufacturing by extraction processes
- (e) Manufacturing by modifications.

Splitting up processes:

Here raw material is broken down, fractionated or split up to obtain the final useful products. Examples cited are those of destructive distillation of coal and refining of crude petroleum oil as obtained from oil wells.

In the first case, coal is thermally broken down in the absence of air to yield coal gas, coke, ammonia liquor, coal tar etc. Each of these ingredients has its own field of utility.

The last named coal tar for example is further fractionated to give various aromatic chemicals like benzene, toluene, naphthalene etc. They form the basic raw materials for several chemical industries. Similarly refining of petroleum crude gives combustible gas (L.P.G.) used as household fuel, kerosene for stoves, gasoline for aircrafts and automobiles, diesel oil for heavy vehicles, solvent naphtha for chemical industry and asphalt for road construction.

Synthetic processes:

In synthetic processing the raw material is converted into useful finished goods by condensing, i.e. by binding or joining together smaller chemical units. Synthetic dye or a sophisticated synthetic medicine is made this way.

Manufacturing by assembling:

This class is exemplified by automobile, aeronautical television or radio industry. Here different components parts are made first and are then assembled to size to give the final useful product.

Manufacturing by extraction:

Examples are extraction of metals from their ores and extractions of medicines (quinine for example) from botanical sources.

Manufacturing by modification:

Here original raw material is modified to get final useful product. Iron ingots can be casted into moulds after melting. The product obtained on cooling is smoothened at its edges and surfaces and is brought to proper shape and design by machinery.

Production function:

As stated earlier production involves or amounts to conversion of raw materials into the finished goods of utility. Many products can be manufactured by different methods and by starting from different raw materials but they cannot be always made into a commercial success e.g. though sea water contains gold we cannot extract it at a competitive price. Since apart from bulk handling involved, its percentage content is very low and hence such an extraction can never be economical.

It is therefore futile to make a product by any route which cannot stand competition in the market since it hasn't got economical sanction. Hence production has to follow the correct route starting from competitively priced raw materials.

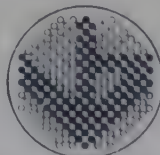
Even after achieving both these points, production cannot be a success unless right amount of final product output (against known input), of right quality is obtained in the shortest possible time limit. And it is here that the management aspect comes into play.

Production activity therefore has to be successfully managed in such a way that starting from the cheaper possible raw materials and following the least expensive route, manufacturing of the finished goods of utility is achieved in the right quality, in the right quantity and in the shortest specified time limit. Production manager can then be looked upon as a person at whose disposal are men, materials and machines. He has to make them productive. Materials are handled by machines and machines in turn are operated by human element. The latter two symbolise energies. Production manager has therefore to channelise these available energies to achieve the preplanned profitable goal. Production management can then also be looked upon as a function involved in channelising available energies, whether their source is found in machines or in humans, to attain the desired organisational objectives.

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Dyestuff and Dye Intermediates: Industrial & Export Opportunities*

B. RAJAGOPAL

General Manager (Marketing), The Atul Products Ltd.

One cannot imagine a world without colour. Even the prehistoric man must have been so enchanted with the vibrant colours of the sky above, the oceans below and the fauna and flora around, spreading a shimmering array of colours, that at the first strains of music might have originated from his throat, as a paean in praise of colour! Colour from time immemorial has been adding zest to life.

In the earlier days, before the advent of the synthetic organic dyes, colours from naturally occurring substances have long been in use on textile. The use of indigo, alizarine, tyrian purple and the like are well known.

Origin of the synthetic dyes manufacture

The synthetic organic dyes and pigments industry had its origin in the year 1856, when William H. Perkin, in his attempts to seek a synthetic route to quinine, accidentally discovered the purple dye mauvine. Discovery of a number of other dyes followed in quick succession in the laboratories of Europe. Some of the largest chemical manufacturers of today, started as the developers and manufacturers of colours in the early part of the century. Many of the path breaking discoveries in the organic chemical industry, owe their development, to the knowledge gained from the synthesis of colours.

Although it was Perkin, who discovered the first synthetic organic dye mauvine in England, the subsequent developments were not dominated by England but, by the European manufacturers. Germany, France and Switzerland in quick succession followed with the development of an array of colours. The American dyestuff industry followed this and by the end of the second World War, they were one of the largest producers of synthetic dyes. The period from the 1930s until the seventies was one of development, growth and stability, contributing to a number of other products developed in the chemical industry, until the first oil price shock, shook the very foundations of this industry in the seventies. Today, the dyestuff manufacturing industry which is capital and labour intensive, by its very nature, being a batch process manufacture, is at cross roads in the developed economies.

Perspective of the industry

The estimation of the global output of synthetic organic dyes and pigments could at best be a guesswork, as no authentic figures are available. However, from available data one

could put together a figure of 800,000 metric tonnes. This could be further broken into countrywise production figures as below:

West Germany	1,80,000 tons
USA	1,20,000 tons
Switzerland	65,000 tons
France	35,000 tons
Japan	60,000 tons
U.K.	50,000 tons
Eastern Europe including USSR	1,40,000 tons
Western Europe (others)	10,000 tons
Taiwan	10,000 tons
Korea	15,000 tons
South American countries	10,000 tons
India	35,000 tons
Thailand, Indonesia and others	10,000 tons
China	60,000 tons
	<hr/> 8,00,000 tons <hr/>

The total global manufacture of different classes of dyestuffs may be divided as below:

Share of major classes of dyes in the global output

Sulphur dyes	18.0%
Directs	17.0%
Acid	16.0%
Disperse	16.5%
Vats	12.0%
Reactives	6.0%
Azoics	6.0%
Basic	4.5%
Pigments	4.0%

(Ref. Textile Dyer & Printer, Dec. 31, 1986, pp. 20/21.)

Now having looked at the manufacturing industry, an assessment of the major end user industry is important and some figures that are available are presented below:

World textile consumption*

	In million tons			
	1986	1995	2000	% growth rate
(1)	(2)	(3)	(4)	(5)
All fibres	36	45.5	52	2.6

* Paper presented by the author at the International Conference on Chem-

(1)	(2)	(3)	(4)	(5)
Cellulosic	17	20.7	23	2.2
Blended fabrics	4.4	7.0	9	5.3

(* from JSDC Vol. 105 - Dec. '89)

With this background if one were to look at the use of various classes of dyes, the figures are as furnished below:

Dyes used in cellulosic fabrics

Class	1973	1979	1988	Growth Future
Direct	75,000	74,000	74,000	Stable
Sulphur	1,08,000	1,00,000	90,000	Declining
Azoics	29,000	20,000	26,000	"
Vats	48,000	47,000	36,000	"
	2,60,000	2,50,000	2,28,000	Declining
Reactives	23,000	42,000	60,000	4% projected
Total	2,83,000	2,92,000	2,88,000	
Indigo	7,000	9,500	12,000	
	2,90,000	3,01,500	3,00,000	

(Ref. JSDC p. 426, Dec. '89)

The figures furnished would show that the European manufacturers produce about 45% of the world output, the Japanese about 9 per cent, the USA about 17.5% and other parts of the world the rest.

Figures of production from China are not available and no amount of guess estimate can lead us anywhere. The fact however remains that the Chinese factories produce a substantial volume of dyestuff and dye intermediates as may be estimated from the quantities that come into various markets and extrapolating these volumes, one can assume a certain volume of production.

The American industry imports, according to data available, an estimated 35 per cent of their total requirement. It is reported that the U.S. consumes approximately 14 per cent of the world output of textiles, and by extrapolating this figure and working out the total use of dyes, one could hazard a figure of imports of 30,000 tons of dyes per annum, in the U.S.A. alone.

Dyestuffs and intermediates

Industry profile

1. Installed capacity 1988-89
 - Organised sector : 36,800 TPA
 - SSI sector : N.A.
2. Production 1987-88
 - Organised sector : 29,051 tonnes
 - SSI sector : N.A.
3. New capacity approved for organised sector during 1988-89 : 4,814 TPA
4. Domestic demand project
 - 1989-90 : 40,065 TPA
 - 1994-95 : 49,980 TPA
 - 1999-2000 : 61,100 TPA
5. Licensing policy : Compulsory licensing
6. Minimum economic size : Not fixed
7. Broad banding : Press note No. 19 (1988 series) of Ministry of Industry No. 10/25/88 LP dated 19.8.1988.
8. Exports 1990 : Rs. 5,000 million approximately
9. Imports 1987-88 : N.A.
10. Export potential :

	1989-90	1994-95	1999-2000
Dyestuffs	8000	11000	13000
Intermediates	10000	13000	16000

(Source - Perspective Plan - Govt. of India)

The Indian scene

Now let us turn to the Indian scene and look at the development of the industry in the last four to five decades. While the origin of the synthetic organic dyestuff and pigment industry can be traced to the year 1856 when William H Perkin synthesised mauvine, it is nearly nine decades later that the Indian synthetic organic dyes industry had its beginning.

Considerable work had been done in the U.K. and Western Europe during these nine decades. In India a beginning was made when in the year 1940, M/s. Associated Research Laboratories made efforts to manufacture rapid fast dyes, as the Indian textile industry was facing an acute scarcity of dyes with the onset of the second World War.

In the year 1941, the Government of India set up a Dyestuff Exploratory Committee which submitted a comprehensive report in 1945 emphasising the importance of the dyestuff industry to the national economy and the need for establishment of the manufacturing facility. A Five Year Plan for the phased manufacture of dyes and some dye intermediates was drawn up.

In line with this recommendation and as a contribution to the national economy by substituting the import of a vital commodity, the Lalbhai group of Ahmedabad, established a manufacturing facility near Valsad, in the West Coast of India, under the name and title, ATUL PRODUCTS LTD. with the objective to manufacture azoic dyes, sulphur black etc. in collaboration with the Calco Division of the American Cyanamid Company. In the next five years a number of other reputed houses set up similar industries for the manufacture of dyestuffs and their intermediates. The rest is history.

The statistical data available for the earliest period of the Indian dyes industry records the details of imports as per annexure-1 for the period 1965 to 1968. For the same period details of exports of dyes are as per annexure-2. In the year 1964, as per data available, the total installed capacity of the organised sector of the Indian dyes manufacturing industry, was 11,170 tonnes and this increased to 15,391 tonnes in 1967 and 21,566 in 1975, which at present stands around 36,000 tons. The details are as per annexure-3. The Indian manufacturing industry has two sectors viz. large scale (organised) and a small scale sector, categorised by investment limits and exclusive reservation of products.

While figures are available for the production in the organised sector, no reliable data is available for production in small scale sector, which has had a phenomenal growth in the last twenty years. There are 48 units today in the organised sector and about 900 units in the small scale sector. On a rough estimation the production in the small scale sector, can be placed around 10,000 tons, comprising largely of direct, acids, mordant and reactivities. The total output of the dyestuff industry alone, in terms of value, may be placed at around Rs. 110 crores. The industry is reported to employ 35,000 persons.

Trends of consuming industry in India

According to the data compiled from the report of the subgroup on synthetic fibres — (Committee for Perspective Planning of Petrochemical Industries 1986-2000) some figures are available. These forecast the demand projection as per annexure 4. In India textile production is largely under three sectors:

Production of cloth in three sectors (in million metres)

	1980-81	1981-82	1985-86	1986-87
Mills (organised)	4168	3808	3376	3303
Powerloom	4140	4547	5886	6149
Handloom	2680	2626	3236	3325
	10988	10981	12498	12777

Estimated forecast of likely production figures of cellulosics and non-cellulosics (in million metres)

	Cotton	Non-cotton	Blends	Total
Mill sector	3050	50/60	1400	4500
Powerloom	2200	2986	214	5400
Handloom	3500	300	800	4600
	8750	3336	2414	14500

The total yarn production during 1986-87 is reported to have been around 1560 million kgs which is a 100 million kg higher than the year 1985-86. This is well over the Seventh Plan target of 1542 million kg of all types of yarns to be achieved by 1990. In the same period, the cloth production has grown from 1250 million metres to 1300 million metres. The target for the Seventh Plan is 1450 million metres and this is likely to be achieved in the light of the growth rate presently recorded. Out of this target of 1450 million metres in the Seventh Plan, 4500 million metres are expected to come out of the organised sector, almost the same quantity from the handloom industry and the rest from the powerloom sector. As against this, the Sixth Plan target was 12000 million metres, comprising 4900 million metres from the organised sector, 4000 million metres from the powerloom sector and 3100 million metres from the handloom sector. The per capita availability of cloth in the Seventh Plan is estimated to reach 17.5 metres.

The synthetic fibre production during the year 1985 has been as below:

Acrylic fibre	21000 tons
Nylon filament yarn	33000 tons
Nylon industrial yarn tyre cord	20000 tons
Polyester staple fibre	39000 tons
Polyester filament yarn	56000 tons

The estimated production of synthetic fibre in the year 1990 is given below:

Polyester staple	212000 tons
Polyester filament	117000 tons
Nylon filament	91000 tons
Acrylic fibre	100000 tons

Based on the various figures thus available, the projection of future trends and the pattern of consumption, the demand projection for the Eighth Plan period may be considered accordingly.

Paper industry

According to data that can be put together, the paper industry which was turning out a total volume of 1.50 million tons

in 1985, is poised to reach a capacity of 4 million tons by the year 2000, as per plan estimates.

Leather industry

Data available on the projection of leather production, estimates a production of 173 MTO-sqm. by the year 2000. The exports of leather and leather goods are expected to reach great heights, by the year 2000, depending upon availability of inputs for the industry. A rough estimation would put the requirement of dyestuff by the leather industry at about 1000/1100 tons per annum.

Given this background it may be observed that the domestic production of dyestuff has almost to be doubled to meet the demand of the various end using industries. The current production of dyestuff in India would hardly account for 4% of the world output and with the opportunities available in the domestic market and the international market, as well, the industry has tremendous potential growth. Based on these data the domestic demand for dyestuffs for 1990, 1995 and 2000 may be estimated as per annexure 5. The per capita consumption of dyes which is around 40 gms today is expected to increase to 62 gms by the year 2000 AD.

Exports

It is a well known fact that the manufacture of dyestuff, by the very nature of the chemistry, is a batch process and highly capital and labour intensive. Besides, the strict environmental protection regulations and effluent disposal limits, have imposed heavy burden of cost on the industry. The developed countries may not therefore be keen to increase investments and expand, in this industry and this might provide a good opportunity to the Indian dyes industry.

Further, in the developed economies, with the rapid changes in fashions and the need to change manufacturing plans to suit these demands forecasting techniques have to be absolutely accurate if one is to avoid being saddled with inventories. This again places the Indian dyes industry in an advantageous position. The latest figure of exports of dyes and dye intermediates available for the period April 1989 to February 1990, shows exports of about Rs. 5,000 million compared to the exports of Rs. 45.49 million in the year 1985-86, this is indeed a spectacular achievement, but considering the opportunities available this is negligible.

Export potential

The statement, as per annexure-7 shows the estimated export potential for dyestuff and intermediates.

But, then, what is holding up the prospects of the industry in India

The high cost Indian economy, compounded by a high ICOR ratio is one of the most important reasons for the slow

growth of the industry. Besides, the high administered price of raw material, supplies of which are mostly controlled by the public sector organisations, high financing costs, scarcity of resources, lack of infrastructural facilities, time consuming procedural problems, are some of the reasons for the uncompetitive status of the industry. The need of the hour is high productivity, availability of inputs at comparable international levels, liberalised regulations and fast clearance of procedural requirements and above all a proper investment climate.

Recognising these needs and requirements, our Government has initiated a number of measures to strengthen the industry. Some of these measures like the simplification of procedures, making available vital inputs at international prices, special low rate of duty on imports of capital goods, lowering of interest rates etc. should go a long way in improving the prospects of the industry. The latest industrial policy announced by the government, indeed augurs well for a growth oriented industrial environment.

Combined with this and with improvements in productivity, technology upgradation in the context of international developments, to reach comparable levels, proper training of man-power, innovations in energy economy, improvement of safety standards and more efficient effluent disposal systems etc., India will be an ideal base, for the growth of the dyestuff and dye intermediates industry, to take advantage of the tremendous opportunities available in the international markets. The Committee, which has drawn up the perspective plan for the industry, has prepared detailed estimates of the basic building blocks and intermediates that would be required to meet the growing demands of dyestuffs, both for the domestic and international markets. These are presented in annexure 6.

Basic building blocks and dye intermediates

Most of the primaries and their derivatives as well as ancillary chemicals are available in the country. Most of the intermediates are manufactured in the organised and small scale sectors. More than 400 intermediate products are required for the manufacture of dyestuff and most of these are today made in the country.

Where do we go from here

Thus far, I have attempted to present a brief but factual presentation of the origin, growth and development of the colouration industry with particular relevance to India. Now looking to the future, one finds an immense opportunity to be exploited. India has a very large reservoir of scientists and technologists and the industry has come of age and the products manufactured have found acceptance in some of the countries where from the product originated. Some of the processes coming out of our National Laboratories have resulted

the introduction of several new chemical synthesis. One cannot ask for better. Thus, there is an industry at a mature level of development, with a vast technical and infrastructural base, raring to go to find a place in the Sun. There is Government machinery willing, and keen, to support, with liberal policies. There is no doubt that the industry is bound to achieve great heights in the years to come. The opportunities are beckoning those who wish to take advantage.

Annexure 1

	Qty. kg (2)	Qty. kg (3)	Qty. kg (4)
Direct dyes	1,16,110	86,954	40,578
Acid dyes	1,71,712	99,792	84,277
Basic dyes	1,54,728	85,534	50,171
Mordant dyes	10,862	16,569	12,840
Naphthols	18,818	32,238	20,367
Fast colour salts	-	-	-
Rapid fast & rapidogens	12,711	14,721	6,798
Fast colour bases	74,034	58,276	78,050
Vat dyes	5,05,056	3,34,870	3,62,344
Solubilised vats	10,523	5,608	1,902
Sulphur dyes	47,958	48,976	36,304
Organic pigments	64,092	76,541	48,253
Pigment printing emulsions	20,934	2,224	10,717
Reactive dyes	82,391	59,294	51,592
Optical whitening agents	14,023	17,731	27,861
Disperse dyes	1,34,578	97,035	79,955
Ingrain dyes	12,162	5,474	7,792

Annexure 3

Dyestuff group	Production (tonnes)			
	1967	1979-80	1984-85	1986-87
Acrylic fibre dyes	-	10	-	6
Azo, acid & direct dyes	2364	3410	2399	2478*
Basic dyes	280	946	51	73
Disperse dyes	13	895	1486	1977*
Fast colour bases	654	1134	716	535
Food dyes	-	65	44	46
Ingrain dyes	28	215	166	137
Naphthols	936	1748	1165	922
Oil and spirit sol. dyes	-	38	29	56
Optical brighteners	590	1105	635	909
Organic pigments (including pigment emulsion)	1375	5352	6159	5901
Reactive dyes	147	1962	2110	2542
Solubilised vat dyes	88	103	52	150*
Stabilised azoics	-	85	52	26
Sulphur dyes	1453	1545	1584	1500
Vat dyes (including indigoids)	1782	1631	1764	1749
Mordant dyes	35	-	-	-
Rapid fast and rapidogens	626	-	-	-
Fast colour salts	149	-	-	-
Miscellaneous dyes	273	-	-	-
Total	11606	20244	18412	19007

(1)	(2)	(3)	(4)
Miscellaneous	15,861	13,783	12,703
Total	14,66,533	10,55,614	9,28,504

Annexure 2

	Qty. kg	Qty. kg	Qty. kg
Direct dyes	17,653	11,750	12,658
Acid dyes	59,396	38,361	41,097
Basic dyes	18,981	8,286	16,019
Mordant dyes	836	-	-
Naphthols	16,754	8,694	17,728
Fast colour salts	40	-	-
Rapid fast and rapidogens	-	-	-
Fast colour bases	10,832	5,343	13,039
Vat dyes	41,521	24,946	16,666
Solubilised vats	-	520	-
Sulphur dyes	37,160	34,550	26,250
Organic pigments	60,290	-	2,801
Pigment emulsions	-	-	-
Reactive dyes	30	-	-
Optical whitening agents	65,488	89,483	42,723
Disperse dyes	25,555	2,480	13,044
Ingrain dyes	10,000	502	9
Miscellaneous	30,848	21,175	23,017
Total	395,384	246,090	213,399

Annexure 4
Textile demand estimates
(million metres)

	1989-90	1994-95	1999-2000
Planning Commission	14500 + Khadi & Hosiery = 16177		21600 + Khadi & Hosiery
Textile Committee	16958	20504	25250
Working group on textiles	15150		
Sub-groups' estimates			
Eco. model-1	15370	18616	22733
Eco. model-2	16547	20261	24928
Eco. model-3 (PCE)	15853	19755	25687
Cotton price equiv. model	15681	18885	22599

Total man-mades

Sub-group models	('000 tonnes)		
Model	1989-90	1994-95	1999-2000
Economic model-1	420	595	833
Economic model-2	595	852	1195
Economic model-3 (PCE)	560	767	999
Cotton price equiv. model	550	737	962
Dev. countries model	567	826/916	1123/1316
The sub-groups' best estimates	550	750	1000

Developing countries model only estimates man-mades. (Synthetics + 1,50,000 tons of cellulose)

Estimated fibre mix

('000 tonnes)

	1990	1995	2000
Total man-made	550	750	1000
Cellulosics	150	150	150
Nylon (20%)	80	120	170
Acrylic (15%)	60	90	130
Polyester (65%)	260	390	550
PEY 60/50	130-156	195-234	275-330
PFY 40/50	104-130	156-195	220-275
Nylon tyre cord	40	50	61
Nylon industrial	6	18	35

The sub-group also compared these estimates with the estimates made by others. The details are given in table alongside.

Textile fibre demand 1989-90

('000 tonnes)

Groups	ASF	PSF	PFY	NFY
Working group on petrochemicals	NW	210	90	90
7th Five Year Plan	30	100/111	77/78	56/70
Working groups on textiles	NW	212	117	91
The sub-groups' estimates	60	104/130	130/156	80

NW = Not worked out.

Annexure 5

Class of dyes	1989-90 (TPA)	1994-95 (TPA)	1999-2000 (TPA)
Acrylic fibres dyes	335	540	800
Azo, acids and direct dyes	8480	9350	10000
Basic dyes	1700	1925	2100
Disperse dyes	5375	8675	12750
Fast colour bases	2770	3150	3500
Food dyes	120	120	120
Ingrain dyes	335	370	400
Naphthols	3650	4150	4650
Oil & spirit soluble dyes	300	400	500
Optical brighteners	2570	3280	4100
Organic pigments (including pigment emulsion)	4425	5650	7200
Reactive dyes	4650	5660	6850
Solubilised vat dyes	150	170	190
Stabilised azoics	200	200	200
Sulphur dyes	3325	4450	5650
Vat dyes (including indigoids)	1680	1900	2150
Total	40065	49980	61100

Annexure 6

Demand projections for major intermediates

(Tonnes)

Intermediates (1)	1989-90 (2)	1994-95 (3)	'99-2000 (4)
Acetanilide	1400	1790	2200
Acetoacetanilide	476	609	740
Acetoacet-o-anisidine	20	26	30
Acetoacet-o-chloroanilide	59	76	90

	(2)	(3)	(4)	(1)	(2)	(3)	(4)
toacet-o-toluidide	19	24	30	4:5'-Bis-(benzoylamino)-1:1'-			
toacet-m-xylydine	83	10	130	dianthrimide	181	235	273
Acetyl-o-toluidine	341	436	530	5:5'-Bis-(benzoylamino)-1:1'-			
aminoacetanilide sulphonic				dianthrimide	48	62	72
acid	34	44	55	Bromamine acid	240	312	362
aminoanthraquinone	565	735	852	3-Bromobenzanthrone	312	406	471
aminoanthraquinone	11130	1469	1704	2-Bromo-3-hydroxyanthra-			
amino-5-benzoylamino-				quinone	42	55	64
anthraquinone	30	39	45	Chicago acid	338	433	530
Amino-2-bromo-4-hydroxy-				Chloroaminophenol-4-sul-			
anthraquinone	150	195	226	phonic acid	58	74	90
Aminoanthraquinone-2-				1-Chloroanthraquinone	232	302	350
carboxylic acid	86	112	130	1-Chloro-2-methylantra-			
Amino-5-chloroanthra-				quinone	38	49	57
quinone	172	224	260	4-Chloro-2-nitroanisole	325	416	505
Amino-2,4-dibromoanthra-				Chloronitrophenol-4-sulphonic			
quinone	194	252	292	acid	92	118	145
Amino-3-hydroxyanthra-				CLT acid	342	438	535
quinone	62	81	94	1:4-Diaminoanthraquinone			
nino iso-G-acid	414	530	650	leuco	254	330	383
Amino-2-methoxy-4(p-tosyl-				2:6-Diaminoanthraquinone	44	57	66
amino)-anthraquinone	32	42	49	4:4'-Diamino-1:1'-			
Amino-4-nitroanthraquinone				dianthrimide	133	173	201
-2-carboxylic acid	76	99	115	4:4'-Diaminostilbene-2:2'-			
Amino-4-nitrophenol	49	63	80	disulphonic acid	1128	1445	1800
Amino-4-(p-tosylamino)				1:4-Diamino-2:3-dichloro-			
anthraquinone-2-sulphonic				anthraquinone	98	127	147
acid	44	57	66	1:4-Diamino-2:3-dicyano-			
nilinesulphonic acid	59	76	90	anthraquinone	40	52	60
anthraquinone	5010	6513	7555	Diaminodihydroxyanthra-			
anthraquinone-1:5-disulphonic				quinone	160	208	241
acid	650	845	980	Diaminodinitroanthraquinone-			
anthraquinone-1:8-disulphonic				disulphonic acid	141	183	212
acid	182	237	275	1:4-Diaminoanthraquinone-2-			
anthraquinone-2:6-disulphonic				sulphonic acid	30	39	45
acid	95	124	144	1:1'-Dianthrimide	128	166	193
anthraquinone-1-sulphonic				Dibenzanthrone	120	156	181
acid	925	1200	1392	4:4'-Dibenzanthronyl	320	416	483
anthraquinone-2-sulphonic				4:5'-Dibenzoylamino-1:1'-			
acid		2193	254	dianthrimide	136	177	205
(Anthraquinone-1-yl-amino)-				3:9-Dibromobenzanthrone	73	95	110
benzanthrone	56		85	1:3-Dibromo-2-hydroxyanthra-			
B-acid	55	70	85	quinone	62	81	94
B-acid	242	310	380	1:5-Dichloroanthraquinone	369	480	557
enzanthrone	1170	1521	1764	3:3-Dichlorobenzidine	445	570	700
Benzoylamino-5-chloro-				2:5-Dichloronitrobenzene	304	389	475
anthraquinone	231	300	348	2:5-Diethoxyaniline	42	50	60
enzoyl J-acid	12	14	20	1:5-Dihydroxyanthraquinone	149	194	225
enzoyl-o-benzoic acid	5628	7316	8487	1:8-Dihydroxyanthraquinone	108	140	162
eta-naphthol	6700	8575	10500	16:17-Dihydroxydibenz-			
etaoxynaphthoic acid (BON				anthrone	713	927	1075
acid)	2150	2450	2800	Dihydroxydinitroanthraqui-			
9-Bis-(anthraquinon-1-yl-				-none	140	182	211
amino)-benzanthrone	90	97	114	Dihydroxydinitroanthra-			
4'-Bis-(benzoylamino)-				quinone-disulphonic acid	256	333	386
1:1'-dianthrimide	143	186	216	2:5-Dimethoxyaniline	50	65	80

(1)	(2)	(3)	(4)	(1)	(2)	(3)
Dinitroanisole	1010	1292	1600	Para-chloroaniline	124	159
2,4-Dinitrochlorobenzene	2000	2550	3100	Para-chloro-ortho-nitroaniline	140	179
4,4'-Dinitro-1:1'-dianthrimide	110	143	166	Para-cresidine	100	128
Dinitrostilbenedisulphonic acid	1246	1600	1950	Para-dichloronitrobenzene	737	934
Diphenoxanthraquinone	85	111	129	Para-nitroacetanilide	42	54
2:8-Diphenylanthraquinone-1-(s):2'(s):6-dithiazole	66	86	100	Para-nitroaniline	320	410
G-salt	900	1150	1400	Para-nitroanisole	307	395
Gamma acid	2100	2700	3300	Para-nitrochlorobenzene	7500	9600
H-acid	5500	7050	8600	Para-nitrotoluene	2000	2550
Halogenated nitroanilines	740	962	1116	Para-nitrotoluenesulphonic acid	1980	2530
Indanthrone	563	732	849	Para-toluenesulphonamide	245	314
Isodibenzanthrone	155	202	234	Para-toluenesulphonyl chloride	89	114
J-acid	418	535	650	Para-toluidine	267	342
J-acid-N-methyl	160	205	250	Para-toluidine-meta-sulphonic acid	74	95
Laurent's acid	90	115	140	Peri acid	490	627
Meta dinitrobenzene	670	860	1050	Phenol derivatives	125	160
Metanilic acid	1170	1500	1850	Phenylenediaminesulphonic acid	148	215
Meta nitroaniline	235	300	370	Phenyl J acid	126	161
Meta nitrobenzenesulphonic acid	391	500	610	1-Phenyl-3-methyl-5-pyrazolone	202	259
Meta nitrochlorobenzene	422	540	660	Phenyl-peri-acid	90	115
Meta nitro-para-toluidine	276	350	425	Phthalic anhydride	9500	12350
Meta phenylenediamine	158	202	250	Quinizarin	361	469
Meta xylylidine-ortho-sulphonic acid	65	7	90	Rhoduline acid	94	120
4-Methyl-ortho-benzoyl-benzoic acid	235	306	355	5-Sulphoanthranilic acid	75	96
2-Methyl-1-nitroanthraquinone	104	135	157	1-(4'-Sulphophenyl)-3-carboxy-5-pyrazolone	218	283
Monoazoanilines	65	85	99	1-(4'-sulphophenyl)-3-methyl-5-pyrazolone	73	95
Naphthionic acid	250	333	405	T-acid	1560	2000
Naphthol AS-D	92	118	145	Tobias acid	1210	1550
Naphthol AS-E	215	275	335	Toluidine	655	838
Naphthylaminesulphonic acid	438	561	685	1:1'-4:1'-Trianthrimide	180	233
Nitroacetyl-para-anisidine	460	589	720	Vinyl sulphone intermediates	2000	2550
Nitroaminophenol	68	87	105	Total	99698	128031
Nitroaminostilbene sulphonic acid	148	189	230			15286
1-Nitroanthraquinone-2-carboxylic acid	97	126	146	Demand projections for major raw materials		
2-Nitro-4-chlorotoluene	103	132	160	(1)	1989-90	1994-95
3-Nitro-para-cresol	95	122	150	(2)	(3)	'99-200
Nitro-para-toluidine	274	351	430	(4)		
Ortho-anisidine	670	850	1050	Organic chemicals		
Ortho-chloroaniline	60	77	95	Acetic acid	7957	9224
Ortho-chloro-para-nitroaniline	151	193	235	Acetic anhydride	1126	1305
Ortho-nitroanisole	949	1215	1500	Acetone	362	463
Ortho-nitrochlorobenzene	3800	4900	6000	Aniline	2000	3000
Ortho-nitrotoluene	2365	3030	3700	Anthranilic acid	110	141
Ortho-toluidine	376	481	590	Benzaldehyde	200	256
Ortho-toluidine	950	1210	1500	Benzene	21000	27000
Oxy-tobias acid	863	1100	1350	Benzoyl chloride	525	672
Para-aminoacetanilide	59	76	90	Benzyl chloride	120	154
Para-anisidine	283	362	440			

	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Ammonium nitrate	261	334	395	Ammonium sulphate	472	604	740
Ammonium chloride	4400	5600	6800	Barium chloride	1647	2108	2570
Ammonium sulphate	1921	2460	3000	Boric acid	222	284	350
Ammonium chloride	511	654	800	Bromine	436	558	680
Ammonium sulphate	325	416	500	Calcium carbonate	550	704	900
Ammonium chloride	186	238	290	Calcium chloride	472	604	730
Ammonium sulphate	1545	1975	2400	Carbon dioxide	437	557	680
Ammonium chloride	1254	1605	1550	Caustic potash	3650	4672	5700
Ammonium sulphate	160	205	250	Caustic soda	8475	10850	13000
Ammonium chloride	55	70	85	Chlorine	50000	64000	78000
Ammonium sulphate	4728	6052	7400	Chlorosulphonic acid	20000	25600	31000
Ammonium chloride	1100	1408	1700	Copper chloride	10000	12800	16000
Ammonium sulphate	94	120	150	Copper sulphate	90	115	140
Ammonium chloride	291	372	450	Disodium hydrogen phosphate	1145	1466	1800
Ammonium sulphate	500	800	1000	Ferrous chloride	148	189	230
Ammonium chloride	2700	6800	9600	Ferrous sulphate	520	666	810
Ammonium sulphate	74	95	115	Glauber's salt	385	493	600
Ammonium chloride	918	1175	1450	Hydrated lime	10000	13000	16000
Ammonium sulphate	276	353	430	Hydrochloric acid	12500	16000	20000
Ammonium chloride	184	236	300	Hydrosulphite of soda	47650	61000	75000
Ammonium sulphate	135	173	210	Iron powder	1844	2360	2880
Ammonium chloride	11000	14000	17000	Limestone powder	12200	15600	19000
Ammonium sulphate	154	197	240	Magnesium chloride	7546	9659	12000
Ammonium chloride	460	589	720	Magnesium sulphate	54	69	85
Ammonium sulphate	48	61	75	Manganese chloride	145	186	230
Ammonium chloride	17000	22000	27000	Manganese dioxide	154	197	240
Ammonium sulphate	425	544	650	Nitric acid	1340	1715	2100
Ammonium chloride	9800	12000	15200	Nitrogen gas (m³)	30000	38000	46000
Ammonium sulphate	1500	1920	2350	Oleum 20-25%	75	96	120
Ammonium chloride	284	364	450	Oleum 60%	24000	31000	38000
Ammonium sulphate	115	147	180	Oxygen gas (m³)	8000	10,250	12,500
Ammonium chloride	88	113	150	Phosgene	50	64	80
Ammonium sulphate	147	198	230	Phosphoric acid	216	276	320
Ammonium chloride	645	785	955	Phosphorous oxychloride	89	114	140
Ammonium sulphate	108	138	170	Phosphorous trichloride	190	243	300
Ammonium chloride	280	358	420	Potassium carbonate	1485	1900	2300
Ammonium sulphate	1300	1664	2030	Potassium chlorate	450	580	700
Ammonium chloride	150	192	240	Potassium chloride	150	192	250
Ammonium sulphate	9000	11500	14000	Potassium iodide	3265	4180	5100
Ammonium chloride	9500	12160	15000	Potassium sulphate	205	262	320
Ammonium sulphate	4000	5120	6250	Raney nickel	1158	1480	1800
Ammonium chloride	121022	157396	193260	Salt	110	141	175
Ammonium sulphate				Soda ash	55000	70000	85000
Ammonium chloride				Sodium acetate	30000	38000	47000
Ammonium sulphate				Sodium bicarbonate	1500	1900	2300
Ammonium chloride				Sodium bisulphate	2364	3025	3700
Ammonium sulphate				Sodium bisulphite	1810	2320	2830
Ammonium chloride				Sodium chlorate	5140	6600	8050
Ammonium sulphate				Sodium cyanide	1626	2054	2500
Ammonium chloride					1064	1400	1700

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Bombay 400 033.

Tel: 851 5993/4, 872 9056

(1)	(2)	(3)	
Sodium dichromate	841	1076	1
Sodium dihydrogen phosphate	96	123	
Sodium hydrogen sulphide	1953	2500	
Sodium hypochlorite	659	837	1
Sodium nitrate	165	204	
Sodium nitrite	4548	6000	7
Sodium sulphate	204	261	
Sodium sulphide	3147	4010	4
Sodium sulphite	163	227	
Sodium thiosulphate	226	289	
Sulphamic acid	284	370	
Sulphur	7800	10000	12
Sulphur dioxide	348	445	
Sulphuric acid	200000	256000	3120
Sulphuryl chloride	746	955	11
Thionyl chloride	334	462	
Zinc chloride	438	564	6
Zinc dust	1500	1875	23
Total	599377	766681	9364

(C) Miscellaneous chemicals

Activated carbon	360	468	5
Auxiliaries	542	842	10
Calsolene oil	36	49	
Carbon black	358	358	4
Dextrine (maize)	1045	1370	17
Dispersing agents	4000	7500	120
Supercel hyflo	250	300	3
Wetting agents	660	870	10
Total	7251	11757	171

Grand total	727650	935834	11469
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(Tonne)

Dyestuff group	1989-90	1994-95	'99-2000
Acid and direct dyes	2000	2800	333
Basic dyes	500	700	82
Optical brightening agents	100	150	17
Organic pigments/pigment dyes	1800	2600	290
Reactive dyes	2000	2800	325
Vat dyes	1200	1500	180
Other dyes	400	550	70
Total	8000	11000	1300
Intermediates	10000	13000	1600

News About New Projects

A BUILD-UP IN FAR EAST COUNTRIES

The dramatic build-up in PTA capacity in the Far East continues unabated. The latest is confirmation of plans for a 50,000 m.t./year facility in Indone-

Mitsui & Co. and Mitsui Petrochemical Co. will collaborate in a joint venture with the state run Pertamina to build this 70 million plant. Capacity is to be expanded to an eventual 500,000 m.t./year. The plant will initially use naphtha para-xylene, but an aromatics complex to manufacture 350,000 m.t./year of para-xylene and 150,000 m.t./year of benzene is expected to soon be in supplies.

Other projects on the anvil in the Far East include Mitsubishi Kasei's 250,000 m.t./year plant also in Indonesia; and Doco Chemical's 250,000 m.t./year plant in China. ICI is poised to start production at its Taiwanese plant shortly, and Mitsubishi's Korean project only recently commenced produc-

PTA demand in Asia is estimated at 4.8 million m.t./year, rising to 4.8 million m.t./year by 1995, to account for 60% of world demand. The growth is driven by strong demand in polyester fibers and resins.

VIET SIBERIAN PROJECT TO FOCUS ON PLASTICS

Environmental objections have persuaded the Soviet Ministry of oil refining and Petrochemicals to recast its proposed project at Surgut in Western Siberia, with a focus now on plastics. Most of chemicals including phenol, ammonia, aromatics, styrene and MTBE have been axed. The core unit, a cracker to produce 330,000 m.t./year of ethylene and other hydrocarbons. Projected

pattern of products along with proposed export plans are as below:

The first stage of the project, producing ethylene and polyethylene is slated for completion by 1994, and other projects are expected a year later.

The project is expected to meet some of the local demand for plastics and more importantly prevent the wasteful flaring of huge quantities of associated gas.

	Output ('000 m.t./ year)	Export ('000 m.t./yr.
Ethylene	330	--
Propylene	104	--
Butylene-butadiene fraction	55	Nil
Polyethylene	300	150
Polypropylene	110	30
Ethylene glycol	120	80
Diethylene glycol	10	Nil

ZIMMER TO BUILD POLYESTER COMPLEX IN SOVIET UNION

Zimmer AG will construct a DM100 million complex to manufacture 11,000 m.t./year of polyester filament yarn. A second line to make another 8,000 m.t./year will be added later. The two lines are expected to come onstream by 1995. Zimmer will supply all the equipment and provide for commissioning and construction activities.

The lines are expected to replace viscose fiber capacity, which are to be phased out on environmental grounds.

DUPONT, TEIJIN TIE-UP ON PET FILM

DuPont and Teijin have signed a letter of intent to set up a joint venture to market and subsequently manufacture, polyethylene terephthalate film (PET) worldwide, except Japan.

The mutually beneficial move is expected to give Teijin better penetration into American markets.

NEW STYRENE-MALEIC ANHYDRIDE JOINT VENTURE

Arco Chemical is tying up with the Japanese concern, Mitsui Toatsu, to set up a 70 million lb/year plant to make its *Dylark*, styrene-maleic anhydride resin. Arco already has a 70 million lb/year plant in the U.S. and the new project, to be located at Osaka, is expected to get going in the second quarter of 1991.

DSM TO BUILD MELAMINE PLANT IN NETHERLANDS

DSM, has signed a preliminary agreement to build a melamine plant in Indonesia with local firms. The 50,000 m.t./year plant will be finalised early next year.

DSM is already the world largest producer of melamine with a capacity of 90,000 m.t./year in the Netherlands and another 50,000 m.t./year through a joint venture in the U.S.

ARGENTINA UPS MALEIC CAPACITY

The Argentinian company Maleic has completed a new 8000 m.t./year maleic acid plant taking its capacity to 14,000 m.t./year, the largest in Latin America.

The plant designed by the Scientific Design Co. is claimed to be the most modern and runs an incinerator to flare off liquid effluents.

International Market Update

HUNGARIAN CHEMICAL INDUSTRY FACES GRIM TIMES

An 80% hike in the price of gas supplied to the industry and a 30% hike in the electricity rates are the latest woes of the Hungarian Chemical Industry which exported some \$300 million a year of petrochemicals. The move comes in the wake of Soviet decisions to cut back on supplies of crude, and to insist on payments in hard currency.

Industry sources complain that they were not consulted before the latest round of increases in feedstock prices, and warn that the moves will seriously affect the export earnings, which are now the largest foreign exchange earners for the country.

HULS CLOSES PHTHALIC PLANT, MARKETS TIGHTEN

Huls (Germany) have announced that it will close, its' 55,000 m.t./year facility to produce phthalic anhydride. The company has noted that margins in the industry do not permit the kind of investments needed to comply with environmental regulations.

Earlier Neste had announced closure of its' 25,000 m.t./year facility, and closure of three producers in Turkey have removed another 22,000 m.t./year from the markets. The European position has also been mirrored, in U.S. markets also where BASF has pulled out around 105,000 m.t./year out of the market. Fourth quarter deliveries are being quoted around 36-37 cents/lb, a rise of 7 cents/lb.

The onset of the Gulf crisis has caused a huge increase in prices of ortho-xylene with fourth quarter deliveries being quoted at DM1000/m.t., up 61% over earlier levels.

MTBE PRICES STABILISE AFTER SURGE

Prices of methyl tert-butyl ether (MTBE) have fallen below levels prevailing in August 1990, largely due to reduced offtake by oil companies. In the three weeks following Iraq's occupation of Kuwait prices moved up to a high of \$650/m.t. fob Rotterdam, from around \$450/m.t.

Since then prices have crashed and supplies are being quoted in the \$370-\$410 per m.t. range, a fall of more than \$200 per m.t.

U.S. prices are now ranging at \$1.05/lb fob, following a high of \$1.50 some weeks ago.

With gasoline prices moving up, the price differential between regular and premium grades of gasoline initially soared, causing motorists in the U.S. to shift to cheaper regular grades. U.S. markets were awash with premium grades and MTBE demand declined dramatically.

Prices are now expected to stabilise around existing levels.

EC OPENS ANTI-DUMPING INVESTIGATIONS ON THE SOVIET UNION

The EC has opened anti-dumping investigations into imports of potash from the USSR. In the period of 1986 to 1989 Soviet share of the EC potash market had increased by around 5% to 11.3% while domestic European production dropped in the same period from 72% to 65%.

The complainants argue that poor domestic prices had led to European operating rates to fall from 84% to 78%.

EC PETROCHEMICALS INDUSTRY FACES OVER-CAPACITY

The European petrochemicals industry faces serious overcapacity in the 1990s with new plants planned during the chemicals boom of the late 1980s coming onstream during a period of slow growth. Senior executives told the *Financial Times* conference on European petrochemicals in London recently.

Mr. Bryan Sanderson, Chief Executive of BP Chemicals, warned that the "over-extended" European industry faced a "midable squeeze" which should lead to restructuring. He pointed out that half the European capacity for producing polyethylenes - key building blocks of petrochemicals - is still in the hands of national companies with no capacity outside their home country. "This hardly seems an appropriate structure with which to approach the European market post-1990. It is as inappropriate for petrochemicals as it is for airlines, aerospace, the automotive industry and almost any other commercial operation."

Mr. Jim Gordon, chemicals co-ordinator for the Royal Dutch/Shell group, said: "We foresee a significant overcapacity affecting overall industry performance" until the mid-1990s, as a result of decisions already taken inside and outside Europe." U.S. petrochemical companies would be quick to close excess capacity than their European counterparts, Mr. Gordon said.

Some speakers at the conference were excited about long term market opportunities in eastern Europe. But Mr. Gordon warned against expecting too much too soon. Mr. Alan Plaistowe, President of Chem Systems Group, described a detailed study of the East European industry by his consultancy.

"We are coming to the conclusion that the capital stock of the industry may be as bad as everyone seems to think," he said. "Some of the modern, larger plants have some chance of survival."

misation and improved operations.

conference Chairman, Mr. Hugo
Director General of the European
Chemical Industry Federation, said that
immediate issue facing the industry
the outcome of the Gulk crisis.

SEPRACOR INC. AND POLYMER LABORATORIES LTD. ENTER JOINT TECHNOLOGY AND MARKETING AGREEMENT

Polymer Laboratories Ltd., who's
Separation Sciences Division speciali-
in the development of high perform-
polymeric chromatography media,
Sepracor Inc., a leader in the devel-
opment of technologies and systems for
downstream protein processing, have
announced the signing of a wide-
ranging joint technology and marketing
agreement.

Under the terms of the agreement,
Sepracor will have the right to market
Polymer Laboratories' full
range of high performance polymeric
chromatography media and prepacked
columns for analytical, preparative and
process-scale protein purification. This
will include Polymer Laboratories' line
of porous polymeric beads for the high
resolution analysis and purification of pro-
teins. In addition, Sepracor and Polymer

Laboratories will continue to develop
and market new chromatographic media
for protein purification by adapting pro-
prietary surface chemistries to Polymer
Laboratories' bulk polymeric beads.

Polymer Laboratories will have the
right to manufacture the new products
developed by Sepracor and to market
these products to the analytical market
for other applications.

"For some time, Sepracor's strategy
has been to integrate its fast, up-front,
membrane-based protein capture tech-
nology with advanced, high resolution
chromatography", said Dr. Robert A
Dishman, Executive Vice-President and
Chief Operating Officer at Sepracor.
"By gaining access to Polymer Labor-
atories' advanced polymeric chromatog-
raphy supports, Sepracor now has the
ideal means with which to realize this
goal".

SENSYCON ON SOLID GROUND AFTER ONE YEAR

One year after the merger of
Degussa-Messtechnik, Hanau, and
VDO Messund Regeltechnik, Hanover,
into Sensycon Gesellschaft fur indu-
strielle Sensorsysteme und Prozessleit-
technik mbH, which has its headquarters
in Hanover, the new company - a fully

owned subsidiary of the Degussa parent
company in Frankfurt -- has achieved
a sound market position. By taking over
technical expertise and customers from
the relevant work areas of its two well-
established parent companies and with
a workforce of 1100, Sensycon enjoyed
a sound starting position.

The most pressing initial task was
therefore to synchronise the two previ-
ously independent field fleets in order
to achieve even greater customer prox-
imity. The two business areas Sensor-
elements and Process Technology were
sub-divided into the work areas: Ele-
ments, Temperature, Process instru-
ments and Process Control Systems,
each of which is now independently
responsible for development, manufac-
ture and sales, in an effort to improve
their market effect.

In addition the three-person manage-
ment board, under the presidency of
Hans-Jurgen Werth, has initiated the
development of new products, includ-
ing temperature layer measuring resis-
tors in SMD technology and new
software for the CM 1 process station.

The company is now also active in
Eastern Germany, with two sales
branches in Ilmenau and Jena and a pro-
duction plant in Geraberg.

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USA	Perchloro Ethylene	Dow, German

Isopropyl Myristate German

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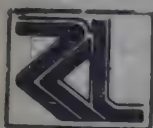
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TECH/C.P./E.P./L.R. GRADES

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 CADMIUM CARBONATE/IODIDE
 COBALT SULPHATE/CHLORIDE
 COPPER/ZINC AMMONIUM SULPHATE
 FERROUS/FERRIC AMMONIUM SULPHATE
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 NICKEL SULPHATE/CHLORIDE
 POTASSIUM BROMATE/BROMIDE
 SODIUM BROMATE/BROMIDE
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Environment

TOXIC LEAK AT SANDOZ

Sandoz has confirmed leakage of 2000 litres of chlorosulphonic acid from its dye intermediates production facility at Hünningen. The leak occurred due to a broken seal in a valve in a production vessel, and Sandoz noted that there was no danger to either local residents or the environment. Water used to contain the release was contained, avoiding an incident similar to the one that occurred at Ciba-Geigy in Basle.

SANDOZ AGREES TO CUT TOXIC EMISSIONS

Sandoz has agreed with the Port of Rotterdam, for cutting emissions of mercury and chromium into the Rhine river, to a level of around 2000 kgs./year by 1995. Further cuts will be envisaged, and these reductions agreed upon, and cut emissions to about half of their present levels.

The Dutch port authority is planning clean-up agreements with a number of other producers, between the Scheldt and Rotterdam.

SCIENTISTS CALL FOR GLOBAL REDUCTION IN CO₂ LEVELS

Scientists at the second world climate conference held recently in Geneva came out with a tough agenda, calling for a reduction of 50% in current levels by the middle of the next century. The scientists have urged that a reduction of 50%/year starting now would be required.

The scientists have noted that with chemical production tapering off, CO₂ will become more important as a cause of

global warming. Some 75% of the CO₂ originate from the industrialised nations with 40% being accounted for by the U.S. and USSR.

Many European nations have agreed to stabilise CO₂ emissions by 2000AD, with the U.K. being given an extension up to 2005. Some countries on the other hand will achieve these targets earlier and Germany, Netherlands and Denmark actually plan on reducing emissions 30% by 2005. The U.S., probably the biggest contributor, has come in for wide criticisms, as it has not committed itself to any cut back. On the contrary it expects emissions to increase by 15% by the year 2000AD.

NEW WATER TREATMENT PLANT FOR FARMS

An effluent treatment process, developed by one of the world's biggest chemical companies to tackle industrial waste problems, has been scaled down to produce a water treatment plant small enough to deal with chemical waste on farms.

The process, called Carbo-Flo, was developed in Britain by ICI for purifying industrial effluents. It is designed to remove unwanted organic substances from water in order to reduce the risk of pollution and help protect the environment.

Carbo-Flo is particularly suitable for dealing with liquid waste from the chemical industry, and it has been used for more than 16 years at ICI factories, including those that manufacture herbicides and other chemicals widely used in the agricultural industry. Water that has been treated by the Carbo-Flo process is non-toxic, colourless and almost odourless, and can be disposed of safely in a soil soakaway.

A small volume of solid sludge is also produced during the cleaning process, and accumulations of this should be disposed of in a landfill site or by a waste disposal contractor.

The small-scale version of the Carbo-Flo process was designed to help farms and other small businesses deal with water contaminated by chemical waste. This is a growing problem for many farmers because of increasing concern over the handling of agrochemicals, including the disposal of residues left over from crop spraying, sheep dipping, and other operations where hazardous chemicals are used.

The range of chemicals used in agriculture has increased, and regulations exist to control their storage handling and use. In Britain these provisions are contained in the Food and Environment Protection Act, which also includes rules to ensure that water contaminated by chemicals and any unused residues are disposed of safely.

The surplus liquid left in the sprayer tank, and even water used to wash out the tank and spray lines at the end of a spraying session, are likely to cause serious pollution if they are simply tipped into a stream or pond. Similarly, if the liquid is poured on to the ground it may seep through the soil and eventually contaminate drinking water supplies.

Regulations to control the disposal of chemical residues have been accepted by most as a sensible precaution to help reduce the risk of environmental damage. The new rules, however, also make it difficult for some people to find a convenient, safe way to get rid of potentially harmful liquids.

Sentinel tests

A scaled-down version of the Carbo-Flo process was developed by ICI to deal with this problem. The result

is the Sentinel effluent treatment plant, designed to clean dilute solutions of organic chemicals.

The Sentinel is made in Chichester, southern England, by E. Allman and Company, one of the leading crop spraying equipment manufacturers in Britain. Allman became involved in the project because it has suitable engineering resources and a well established marketing organisation for agricultural equipment.

The equipment was developed by Allman engineers in collaboration with ICI, and a prototype of the plant was used for an independent test programme in 1987. The tests were carried out by the Ministry of Agriculture, Fisheries and Food's Agricultural Development and Advisory Service at its Harpenden Laboratory, near London.

Liquid used for the tests was a cocktail of pesticides, added together in water to produce a solution containing 25 percent of the maximum concentrations recommended for crop spraying. This mixture was processed in the Sentinel plant, using the procedure recommended by ICI, and samples were taken at intervals for analysis. Chemicals in the test mixture included widely used products from the most important pesticide categories representing a typical season's spraying programme on an arable farm. It contained 2, 4-D,

demeton-S-methyl, gamma-HCH, pirimicarb, propiconazole, cypermethrin, mecoprop and paraquat. This mixture was tested twice by the Sentinel equipment, and a third test was carried out on water contaminated by sheep dip and a solution containing pesticide waste, which was mainly organic solvent-based.

Analysis of the final effluent showed that a high proportion of the chemicals had been removed by the Carbo-Flo treatment process. The level of each pesticide in the original cocktail was reduced to less than 0.05 g/ml after treatment, and for most the content was less than 0.02 g/ml in the final liquid.

Carbo-Flo was also tested on an intensive arable farm where chemical disposal problems had been experienced, and this provided an opportunity to assess the process and equipment in commercial conditions without technically qualified supervision.

The treatment process in Sentinel is carried out on a batch basis. Materials used are pre-packaged in the correct amounts for one batch. This means the plant does not have to be operated by a qualified chemist, as there is no measuring, weighing or mixing to be done.

Flocculation and filtration

There are two main stages in the pro-

cess. The first is a flocculation operation in which suspended solids are collected in a sediment. The sediment accumulates as a sludge which has to be removed and disposed of safely. A 1,000-litre batch of liquid produces about 18 kg. of sludge, with a water content of approximately 80 percent.

Stage two involves filtration, using gravel and a carbon module to remove dissolved organic matter. Each carbon module remains effective for about 20 batches of effluent, and a colouring indicator in each pre-pack of treatment materials shows when the carbon module should be replaced. The final liquid can be allowed to soak away into the soil, but there may be enough chemical remaining in the liquid to damage fish if it is discharged directly into a stream or pond.

Sentinel is supplied as a standard package to deal with 1,000-litre batches of liquid. The equipment is mounted in a steel frame and can be moved on a forklift truck or the three-point linkage of a tractor.

It is supplied complete with a 12 V dc or 240 V ac electric motor to operate an agitation paddle, and there is also a filling pump powered by either a 1.49 kW single phase motor or a 2.24 kW petrol engine. The unit measures 2.2 x 1.16 x 3 m, and the shipping weight is 680 kg.

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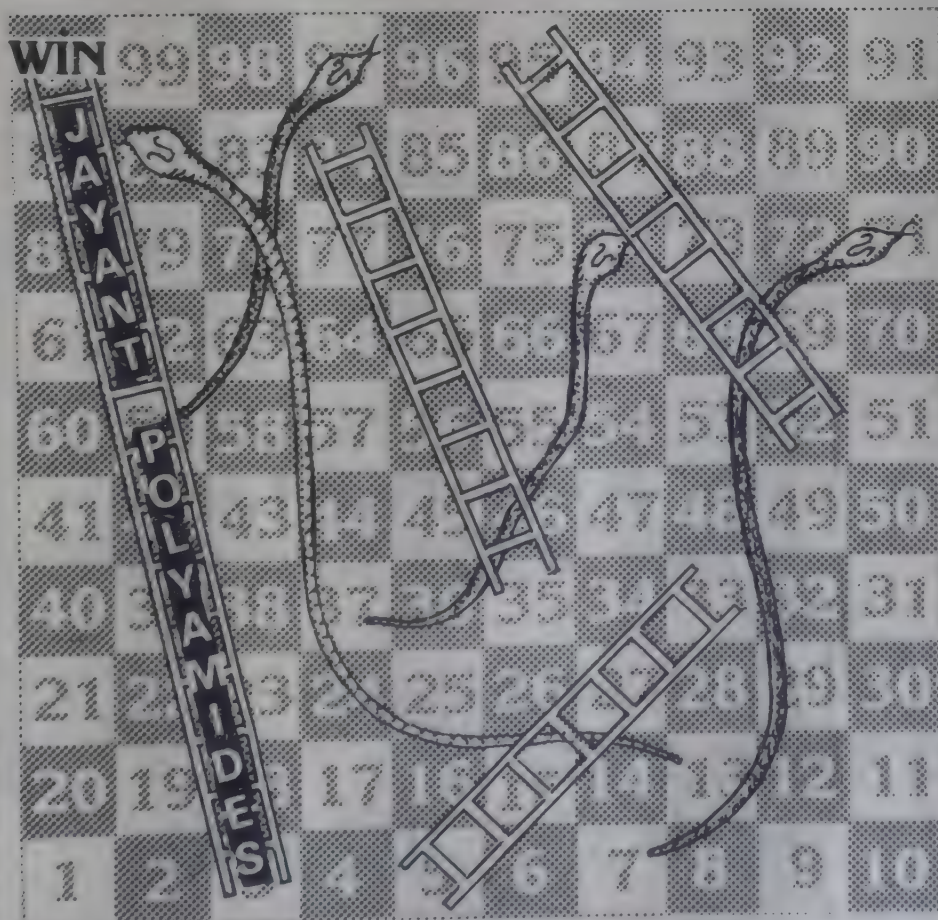
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News from Japan

ETHYLENE MAKERS INCREASE RELIANCE ON DOMESTIC NAPHTHA

Japanese ethylene producers are hurriedly increasing their reliance on domestically-produced naphtha in the wake of steeply higher overseas naphtha prices and greater volumes of crude oil processed domestically. This trend became more visible this year with readily rising overseas naphtha prices.

In the January-June period, dependence on domestic naphtha had risen to 31%, compared with 4.87% last year. Following the Iraqi annexation of Kuwait in August, 50% of the naphtha previously obtained from Iraq and Kuwait was shifted to domestic production. This event, coupled with a climbing domestic procurement ratio by Japanese oil refiners, has pushed the petrochemical industry towards an expanded domestic naphtha-producing structure. It now appears that ethylene makers will reach a 10% dependence on domestic naphtha in the July-December period.

Reflecting the severity of obtaining required supplies, ethylene makers are diversifying feedstocks through procurements of such raw materials as butane and heavy NGL, and formulating measures to switch from foreign to domestic raw materials.

Imports of naphtha, an ethylene feedstock, were essentially liberalized when structural depression faced the petrochemical industry in 1982. Dependence on imported naphtha has risen swiftly since that time, with domestic ethylene producers rushing to acquire import (storage) tanks and otherwise build up the required infrastructure.

The industry became 95% dependent on imported naphtha, and successfully used the cheap supplies to strengthen its international competitiveness. Overseas

naphtha prices began creeping up in mid-1989, however. Currently, South Korea and a number of other new naphtha-consuming countries entered the stage, making it more difficult to obtain cheap sources of the material. Aggravating the situation was Iraq's incursion into Kuwait. One result of the Persian Gulf crisis was the disappearance of Iraqi and Kuwaiti naphtha, and higher prices as these volumes were shifted to Saudi Arabia and other countries.

During this period, a framework was designed for expanding domestic crude oil processing volumes, and plans were drawn up to ensure stable supplies of gasoline, kerosene and other oil products. At first, priority was given to light grades for gasoline. But the end of the gasoline demand period and surge in naphtha prices overseas enhanced the profitability of naphtha. This development, together with vigorous demand from petrochemical makers, prompted petroleum refiners to boost the percentage of naphtha produced in Japan.

Companies operating ethylene complexes have been aggressively diversifying raw material imports, extending to butane and heavy NGL, but imports are limited by the availability of storage and handling facilities and problems with the domestic tax system. As a result, ethylene makers have no choice but to hike their dependence on domestic naphtha to obtain stable supplies. They have already boosted second-half domestic reliance beyond the first half figure, making it likely that a 10% ratio will be achieved this year.

APPROVAL SYSTEM GOES INTO FORCE FOR SPECIFIED CFC EXPORTS

The Ministry of International Trade and Industry (MITI) on October 11 decided to make specified CFC (chlorofluorocarbon) exports subject to approval in accordance with the provi-

sions of the "Foreign Exchange and Foreign Trade Control Law". Accordingly, it revised "Regulations Concerning Operation of Export Trade Control Ordinance" (issued under date of November 6, 1987), for enforcement from October 12. Specified CFC's are some of the materials specified in the Ozone Layer Protection Law.

The Montreal Protocol calls for total abolition of the gases by 2000. There is a growing tendency to move up the dates of the scheduled reduction. MITI explained that the system of approval for exports was established "from the standpoint of securing a more appropriate supply". It can be thought, however, that MITI took into consideration the international trend for CFC reduction.

Specified CFCs comprise five items — chlorobentafluoroethane (CFC 115), dichlorodifluoromethane (CFC 12), dichlorotetrafluoroethane (CFC 114), trichlorotrifluoroethane (CFC 113), trichlorofluoromethane (CFC 11) — and their mixtures. Approval of exports is required in the case of those contained in tanks for transportation or storage, cylinders, cans and other receptacles, and in the case of mixed solvent falling under No. 3814.00 in the list of export items. However, the following items are excluded: (1) those which are used as injection materials for aerosol cans; (2) those which are used as cooling medium for freezing and refrigerating plants; (3) those which are used as heating medium; and (4) foaming products and the items contained in their materials.

The approval system for exports is applied to all areas. An application for approval of exports must be presented to the International Trade Office of the General Affairs Section of the Basic Industries Bureau. It is necessary to present the original text and a copy of the papers certifying export contracts or written export contracts, besides two written applications (original text will be returned later).

Those who have secured export approval must present monthly records of shipment (of materials causing destruction of the ozone layer) at the end of every quarter.

SHELL INTERNATIONAL CHEMICAL FOCUSING CAPITAL SPENDING ON ASIA

Shell International Chemical (U.K.) is scheduled to invest a total of \$1,500 million in Asian countries in the coming three years. In Indonesia, the British firm plans to build a petrochemical complex (ethylene, 350,000 t/y; propylene 220,000 t/y; polyethylene 300,000 t/y; polypropylene, 160,000 t/y and ethylene glycol, 100,000 t/y in a team-up with Mitsui & Co., and C. Itoh — both big Japanese traders — and local interests including Pertamina. A company official claims: "Indonesia has attained high economic growth and most of the planned production will be sold on the domestic market".

In India, the company has applied to the government for approval of an investment plan aimed at constructing an additional petrochemical plant. It is running a petrochemical complex in the country on a joint-venture basis.

In Malaysia, it has worked out a plan for building a 30,000-t/y polystyrene plant. In Japan, it aims to construct a thermoplastic-elastomer plant in partnership with Japan Synthetic Rubber. In South Korea, it — together with Kumho Petrochemical Industry (South Korea) — is building production facilities for phenol, bisphenol A and epoxy resin with start-up scheduled for the end of this year or early next year.

The company's sales break down into 51.1% for Europe, 31.1% for the U.S., 11.1% for Asia and 6.6% for South America. The company expects sales in Asia and South America to show higher growth than in the States and Europe. It envisages raising the share of the former two areas to 40% ten years hence

by stepping up capital spending there.

Petroleum-based petrochemical producers in Europe — including Shell International Chemical — have been intent on building up their downstream business in expectation of increased earnings stemming from price boosts for oil products, which have been triggered by the Gulf crisis.

KYOEISHA CHEMICAL, GERMAN FIRM TIE UP FOR PAINT ADDITIVE MARKETING

Kyoeisha Chemical Co. of Japan and Tego Chemie Service GmbH of Germany have reached an agreement on tie-up in the marketing of and production technology for their respective paint additives. Under the agreement, both companies will import from next January the partner's paint additives and market them in Japan and Germany under the importers' brand names.

Tego Chemie is a wholly owned subsidiary of Th. Goldschmidt GmbH of Germany. The Japanese firm will be transferred from Th. Goldschmidt Japan Co. — wholly owned Japanese subsidiary of Th. Goldschmidt — the sales rights for such chemicals of Tego's, and will become in reality the sole agent of Th. Goldschmidt in Japan for the chemicals. Kyoeisha also plans to manufacture in Japan, Tego products in the future.

Behind this is Kyoeisha's strong desire to expand its product range as well as advance into West Europe and Th. Goldschmidt's intention of expanding and strengthening operations in Japan. Tego Chemie will also market the partner's additives in Europe through its sales routes and those of other Th. Goldschmidt subsidiaries.

Both companies believe that the partnership will offer to their customers a wider range of paint additives and give them a freer choice of the products as well as better customer services. The

agreement also gives each company full access to the partner's R&D facilities and laboratories to tackle the technological issues common to them.

The Japanese firm plans to sell ¥1 billion of the imported additives in Japan in the initial year with their sales five years ahead targeted at ¥500 million.

It has long been engaged in surfactant production and marketing and has in recent years branched out into paint and polymer additives for diversification. It opened in 1988 a liaison office in New York and has established footings in the U.S., Southeast Asian and African markets, but is lagging behind other counterparts in operations in Europe.

TOP FLAVOR & FRAGRANCE MAKER BOOSTING FLAVOR-MIXING CAPACITY

Takasago International Corp., is now constructing a flavor-mixing plant at its Hiratsuka factory (Kanagawa Prefecture) by investing about ¥2.9 billion.

The plant scheduled to be completed by the end of next year will increase the company's flavor-mixing capacity there by 80%.

The plant construction is the nucleus of its new 5-year program aimed at consolidating its business structure for flavors and fragrances and diversification as well as pushing globalization.

Under the plan, Japan's top flavor-and-fragrance maker has been striving to streamline the production facilities at its Iwata (Shizuoka), Kashima (Ibaraki) and Hiratsuka factories to raise production efficiency. The company intends to modernize and concentrate its facilities for synthetic flavors and fragrances at the Iwata factory, those for refining aromatic substances at the Kashima factory and those for mixing them at Hiratsuka factory, respectively.

The new Hiratsuka plant is designed to have a 4,000-t/y mixing capacity, up 10 per cent over the capacity of the old plant. It will be a 3-storey building with a total floor space of 6,000 m².

STU, KUREHA CHEMICAL JOIN HANDS IN NEW CCS DEVELOPMENT

Fujitsu Ltd. has announced the signing of an agreement with Kureha Chemical Industry Co. for joint development of a new computer chemistry system (CCS). The endeavor will focus on molecular and quantum chemistry-related theoretical calculations, and will include a molecular design-support system integrating molecular modeling functions and a visibility function for analyzing results. The two companies signed a similar agreement six years ago, and in 1986, successfully engineered the "ANCHOR" system. The decision to team up again and develop a new generation system was made in light of the dizzying pace of change in the computer chemistry field.

Fujitsu is also involved in research on domestic and overseas research organizations, including Australian National University, and several joint projects with commercial objectives. The company plans to steadily announce research results through the rest of the year, and launch a CCS marketing campaign sometime next year.

STANDARDS FOR NATURAL FOOD ADDITIVES SEEN BEING

Japan Food Additives Association has begun to make preparations for publishing next March standards for natural food additives. Standards for chemically synthesized additives have already been established and food producers are obliged to specify food additives — both natural and synthetic — on product packages as from next July. There is an official document covering standards for 10 natural food additives. In

addition, the association's predecessor previously worked out standards for another 43 natural food additives. On the other hand, FAO/WHO joint Expert Committee for Food Additives has also established standards for a total of 42 items of natural food additives. The association intends to coordinate and unify the three types of standards for natural food additives, thereby establishing those that will be accepted by the international community. It envisages improving domestic standards using advanced scientific analysis technology.

It will concentrate its energy on establishing standards for colorants, antioxidants and sweeteners. According to the Ministry of Health and Welfare, there are about 1,000 natural food additives including approximately 500 flavors. The association aims to establish new standards covering roughly 60 items.

WAKAYAMA SEIKA PRODUCES 4,4'-DIAMINODIPHENYLETHER

Wakayama Seika Kogyo Co. has started producing 4,4'-diaminodiphenylether (DPE) — raw material for polyimide/polyamide resins — using a new manufacturing plant for raw materials for engineering plastics. The new plant is located at its Kainan factory (Wakayama Prefecture). The resins are widely used in electronic materials with the prosperity of the electronics business in the background. If the 4,4'-DPE production gets successfully under way, the company intends to produce 4,4'-diaminodiphenylsulfone, 2, 2'-bis(4-(4-aminophenoxy) phenyl) propane and 4,4'-diaminobenzanilide. On completion of the new plant, the company shifted DPE production from its Wakayama factory to the Kainan factory, which has become the company's production base for heat-resistant high polymers. At the same factory, it has already build production facilities for dichlorohydrabenzene — pigment intermediate — and o-nitrochlorobenzene derivatives — dye/pigment intermediates.

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New Developments from Japan

AWA BEGINS CLINICAL OF AGENT AGAINST ET DISEASE

Fujisawa Pharmaceutical Co. will start clinical testing of 'FK 506' immunosuppressant for treatment of an autoimmune disease. The agent will first be applied to Behcet disease, a chronic disease causing serious inflammation with eyes. This follows the start in July of FK 506 clinical tests in the U.S., Europe and Japan in a bid to prevent patients from rejecting transplanted organs. Fujisawa plans to further extend the application of the drug to other autoimmune diseases such as collagen disease and rheumatoid arthritis.

Cyclosporine has so far been used to suppress patients' rejection of transplanted organs and FK 506 has proved to have greater immunosuppressing effect than cyclosporine, attracting attention especially in the West where transplantation of organs prevails. It is absorbing the attention of the medical community as it is certain that the number of transplants will increase in the future.

In Japan, FK 506 clinical tests began in an attempt to suppress rejection at the time of transplantation of the kidneys. It is now used, too, in the case of transplantation of the liver. Animal tests conducted by Professor K. Masuda of the Medical Department of Tokyo University show that FK 506 is more effective in the treatment of Behcet disease — a chronic disease that may lead to blindness — than in the case of using cyclosporine. Fujisawa thus hurried to start the clinical testing of FK 506.

NEW REACTION APPLIED NEW SENSOR: MATSUSHITA

Matsushita Electric Industrial Co. has developed a biological sensor designed to instantly detect target materials on

the strength of an antigen-antibody reaction.

'The company has applied the device to the manufacture of TNT-detecting equipment, which is large-sized but, it claims, will be scaled down to desktop-size through, for example, improvement of detecting signals.

It has established basic production technology for monoclonal antibodies indispensable to the antigen-antibody reaction. The new sensor will be used for detecting residual agrochemicals and small materials.

ACTIVE CARBON WITH FINE METAL POWDER HAS ANTI- BACTERIAL EFFECT

A research group at Hiroshima University has succeeded in developing an ultrafine silver particles-contained active carbon having an excellent anti-

bacterial property by means of the method for producing a new-type metallic particle-carbon composite it has also developed.

The porous carbon — active carbon — in which ultrafine silver particles are uniformly dispersed has proved to have strong resistance to E coli, pyocyanic bacillus and hay bacillus, etc.

It is easily made into fibrous form, granules and pellets, the researchers involved say. They believe it will be commercially applied in various fields and may be marketed within two years.

Active carbon of this type is produced by sintering, in the presence of inactive gas, a mixture of a macromolecular metallic complex or pitch and an organic metal. This process is easy to carry out and as the organic metal, gold, silver, copper, iron, cobalt, rhodium, nickel, platinum and mercury can be used to give the active carbon a bactericidal

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property. Silver has been chosen because it is not easily dissolved in water, sticks firmly to the carbon, maintains activity for a long time and can be processed into a variety of forms.

MITI TO DEVELOP NEW-TYPE CFC USED AS COOLANT FOR HEAT PUMP

In compliance with the Montreal Protocol, the Ministry of International Trade and Industry (MITI) has inaugurated a 5-year project aimed at developing a new coolant (3rd generation CFC) for a compression-type heat pump. The project calls for a total of ¥5,000 million in R&D expenses. The said protocol is aimed at completely banning use of the specified CFCs (1st-generation CFCs) after January 1, 2000. It is forecast that 2nd-generation CFCs will be put into practical use on a full scale after 1992. A MITI official says: "It will be difficult to utilize 3rd-generation CFCs on a commercial basis during the cur-

rent century. MITI aims to pioneer an alternative to CFC-114 now used as a coolant for a heat pump. The target product is required to fulfill the following conditions: (1) its boiling point is on a reasonable level in which waste heat of 30-60°C can be efficiently utilized, (2) it is highly stable in the high temperature range between 100 and 150°C, (3) equal or superior to CFC-144 in terms of economic efficiency, (4) compatible with lubricant, (5) flame-retardant, (6) nondestructive to the ozone layer and (7) it hardly produces the greenhouse effect. The targeted coolant will be a fluorine compound containing alcohol or ester: it will have a new molecular structure completely different from that of existing products.

ULTRAHIGH-PURITY WATER CAN BE RECYCLED: KURITA

Kurita Water Industries Ltd. has developed a recycling system for ultrapure wastewater discharged from man-

ufacturing processes for semiconductor.

The new process incorporates a biological reactor, in which oligotrophic bacteria immobilized on special carriers take carbon contained in the wastewater: carbon stems from the presence of isopropyl alcohol and other organic solvents. The bacteria can be removed from the carriers using the "Cornu Spiral UF" ultrafilter. In conventional methods, ultraviolet rays are used for treatment of such carbon. The recycling system is almost equal to conventional methods in initial cost; its running cost is about half the latter. In addition, installation space with the former is approximately 30 per cent smaller than with the latter. The company aims to market the recycling system for use in the production of high-density chips. DRAM chips of 4M or higher capacity. Ultrapure water is being increasingly recycled in Japan's semiconductor industry.



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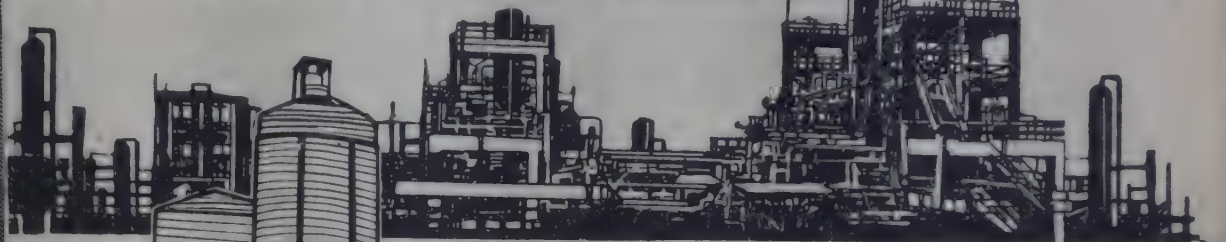
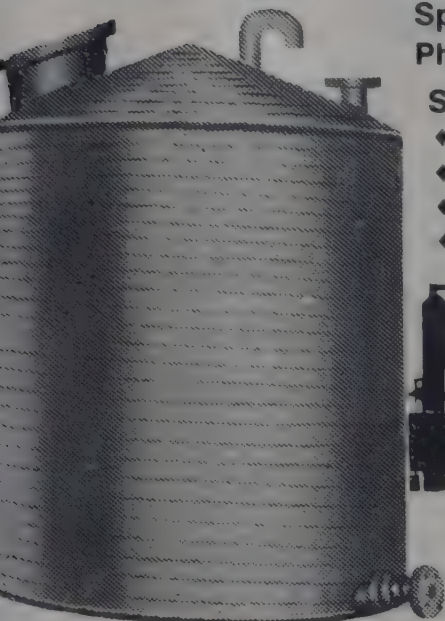
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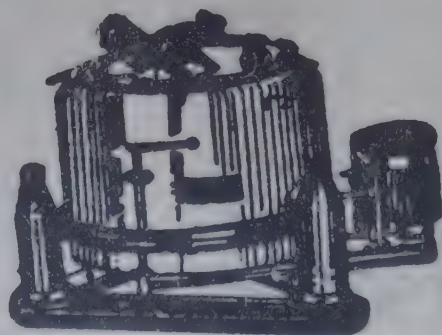
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We also Fabricate

REACTION VESSELS, PRESSURE VESSELS,
CONDENSORS, STORAGE TANKS, BALL
MILLS & MS/SS FABRICATION.

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Ram Baug, Behind State Bank of India, S.V. Road,
Chincholi, Malad (West), Bombay-400 064.

Phones: Factory: 6821401/6821695 Resl.: 6821894

Agent for Andhra Pradesh -- Mr. M.N. Rao, M/s. Anrudh Agencies, B-16, View Towers,
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Available From Ready Stocks:

TITANIUM DIOXIDE - ANATASE/RUTILE**Barium Carbonate** — China
(98% minimum)**Barium Chloride** — China
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Hyflosupercell

— Johns Manville/U.S.A.

Gum Rosin — China/Indian

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Phone: 335760, 324665, 327637 Resi.: 452376, 455093 Telex: 11-71720 OM-IN

For Your Regular Requirement of:

MANGANESE CHLORIDE (98% Min.)Used in Dyes, Polymerisation Catalyst, Linseed Oil Drier,
Fuel Oil Additives, Disinfectant)**MANGANESE ACETATE (99.5% Min.)**

Used in Catalyst: Fibre Grade, oxidations.

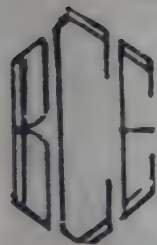
MANGANESE CARBONATE (45% Mn)

Please Contact Manufacturers

BORG CHEMINOVA PVT. LTD.

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**QUALITATIVELY & QUANTITATIVELY THE BEST**☐ **GUM ACCACIA**

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PARACHLORO BENZYL CYANIDE (P.C.B.C.N.)

For Your Requirements Contact:

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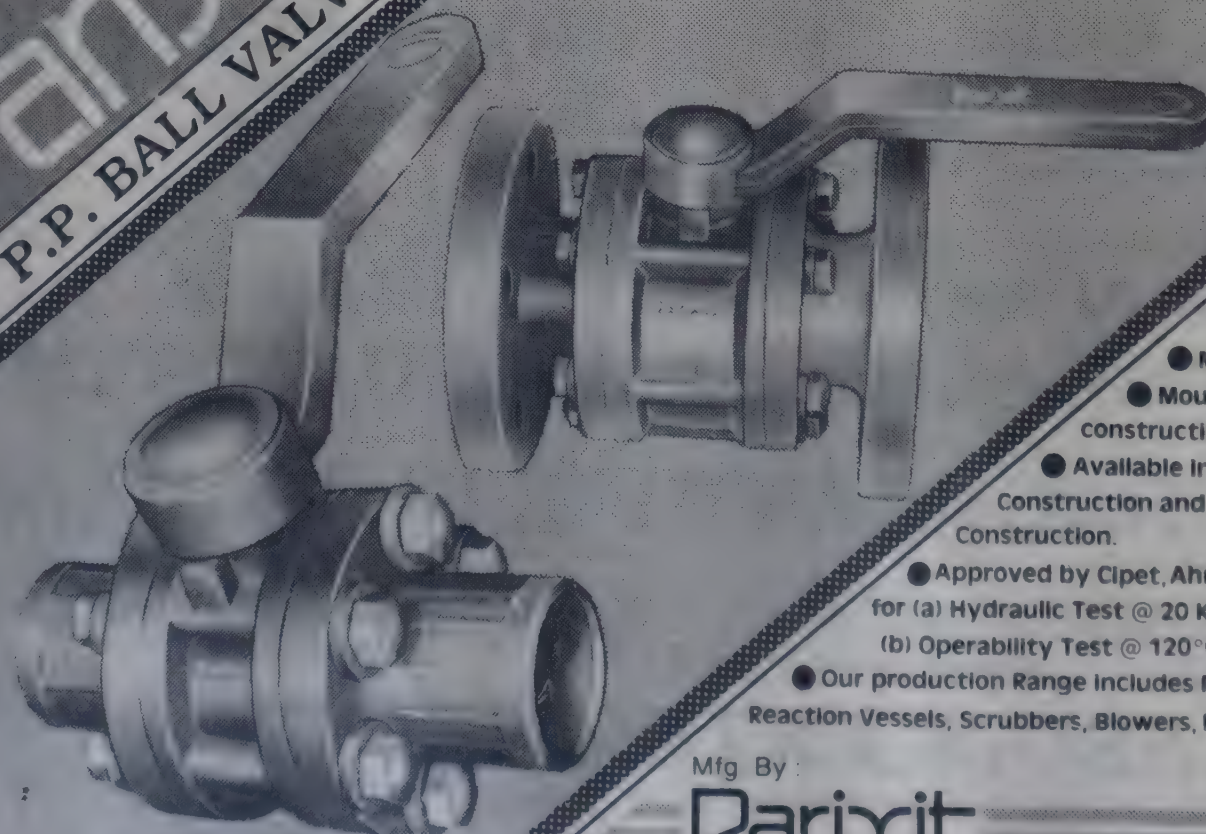
9, Khajina Mahal 3rd Floor,
189, S.V. Road, Opp. Railway Station
Andheri (West)
BOMBAY 400 058

PHONES: 6284969, 6280159

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MARKET INFORMATION

MEK maintains high levels

Prices of methyl ethyl ketone continued to rule at high levels in the Bombay chemicals market during the week under review. Although Cetex Petrochemicals had resumed production, virtually no material has come into the market.

Acrylamide firmed up slightly after being shifted from OGL to actual users category. Cyanuric chloride firmed up on poor availability of imports. Availability of dye intermediates remained poor and trading was moderate.

We cannot guarantee the accuracy of the prices published in **CHEMICAL WEEKLY** as they are based only on the enquiries made by our correspondent -- and, as such they are not **FIRM PRICES** as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on December 11, 1990)

INDUSTRIAL CHEMICALS	Per Kg.				
Ammonium sulphate	2.50	Borax (Granular)	19.00	Cobalt oxide	550.00
Ammonium phosphate (Mono)	16.00	Borax (Powder)	24.00	Cresylic acid	62.00
Ammonium phosphate (Di)	16.00	Boric acid (Tech)	45.00	Camphor (Indian)	107.00
Ammonium carbonate (Di)	17.00	Bisphenol-A	75.00	Cream of Tartar (Tech.) China	70.00
Ammonium bicarbonate	6.00	Butyl carbitol	106.00	Citric acid (Belgium) (Resale)	47.00
Ammonium chloride	4.00	Caustic soda (Flakes)	12.80	Citric acid (Indian) (Resale)	44.00
Ammonium nitrate	6.50	Caustic soda (Solid)	12.00	Copper sulphate	25.00
Arsenic white powder	22+ST	Caustic soda (Lye)	11.50	Chromic acid	70.00
Acrylamide (Resale)	85.00	Calcium chloride 70% (Solid)	3.25	Ethylene urea	65.00
Barium carbonate	18.00	Calcium chloride 75-80%(fused)	3.50	Ferric chloride (Lumps)	9.00
Bleaching powder (33% Cl)	5.00	Calcium chloride 36% (Anhydrous)	5.00	Ferric chloride (Anhydrous)	20.00
		Calcium carbonate (precipitated)	6.00	Glue flakes	15.00
		Calcium carbonate (Activated)	5.75	Glue sheets	6.75
				Gohsenol GH-17	130.00
				Hydro	45.00

FOR YOUR REQUIREMENT OF

PARA CHLORO PHENOL
ORTHO CHLORO PHENOL
MONO CHLORO PHENOL
DICHLORO PHENE
SULFURYL CHLORIDE
E.D.T.A.

MONO CHLORO ACETIC ACID
(MCA)
ISOPROPYL BROMIDE
CAUSTIC POTASH FLAKES
POTASSIUM CARBONATE
NORMAL BUTYL BROMIDE (NBBR)

Authorised Dealer of

M/s. Standard Alkali,
M/s. Anupam Rasayan,

M/s. Odex Chemicals Pvt. Ltd.,
M/s. P.K. Velu & Co. Pvt. Ltd.,

Please Contact:



**Shree Amruta
Organics Pvt. Ltd.**

813, Raheja Centre, 214, Nariman Point, Bombay 400 021.
Phone: 240415, 243979, 2873680 Telex: 11 6053 SATC

4A-B, Trade Centre, Near Stadium House,
Ahmedabad 380 014.
Telephone: 462332

Hyflosupercell	30.00	Sodium sulphide 58-60% (Flakes) (TCL)	25.00	Benzyl Alcohol	60.00
Hexamine (Resale)	39.00	Sodium sulphide pure (Flakes)	12.25	Benzyl Chloride	34.00
Industrial Wax	25.00	Sodium nitrite (Resale) per 50 kg.	1,300.00	Benzo trichloride	16.00
Litharge	40.00	Sodium chlorite 80% (Spain)	100+ST	Benzoyl chloride	22.00
Lead Acetate (Tech.)	39.00	Soda Ash (Tata)	5.50	Bromine Liquid	68.00
Lithopone	34.00	Soda Ash (Birla)	5.50	Chloroform	30.00
Magnesium chloride (Crystal)	2.75	Soda Ash (Imp.)	5.50	Carbon Tetrachloride	20.00
Menthol crystal (Flakes)	360+Ex+ST	Sodium bicarbonate	7.00	Cellosolve	65.00
Menthol bold	425+Ex+ST	Sodium bisulphite	8.00	Cyclohexanone	64.00
Menthol crystal cold	395+Ex+ST	Sodium silicate	5.50	Cyclohexanol	58.00
Magnesium carbonate (Japan)	30.00	Sodium acetate	8.00	Diacetone (Resale)	26.00
Magnesium carbonate (Indian)	26.00	Sodium alginate	450.00	Diethyl Oxalate	34.00
Maleic Anhydride (Resale)	45.00	Titanium Dioxide (Anatase)	60.00	Diethyl glycol (DEG) (Resale)	38.00
Mercury (34.5 Kgs)	10,800.00	Titanium Dioxide (Rutile -- RCR ₂)	95+ST	Dioctyl Phthalate	60.00
Nickel chloride	110.00	Tartaric acid	220.00	Diallyl Phthalate	44.00
Oxalic acid (Resale)	14.00	Trisodium phosphate	12.00	Dimethyl Phthalate	48.00
Peppermint oil (Rectified)	188+Ex+ST	Thiourea	75.00	Dioctyl Adipate	58.00
Potassium carbonate (Indian)	28.00	Urea (Tech.)	3.00	Dibutyl Adipate	42.00
Potassium carbonate (Imported)	32.00	Vacuum salt	1.00	Dipentene	15.00
Potassium bichromate	42.00	Zinc Dust	52.00	Dimethylamine 40%	30.00
Potassium phosphate (Mono)	34.00	Zinc Oxide	58.00	Dimethylamine 50%	35.00
Potassium phosphate (Di)	25.00	Zinc chloride powder (Tech.)	20.50	Ethyl Acetate	22.00
Polyvinyl alcohol (No. 117)	93.00	Zinc sulphate	7.00	Ethyl Acrylate	70.00
Polyvinyl alcohol (No. 173)	150.00			Ethylene Dichloride	18.00
Polyvinyl alcohol (No. 208)	170.00			Ethylene Glycol	38.00
Paraformaldehyde (Resale)	22.50			Formic Acid (Imp.)	24.00
Phthalic anhydride (Resale)	58.00	SOLVENTS	Per Kg.	Formaldehyde (Resale)	7.00
Pentaerythritol (Resale)	52.00	Acetic Acid Glacial (Resale)	16.50	Glycerine (CP)	48.00
Paraffin wax	25+ST	Acetic Anhydride (Resale)	40.00	Glycerine (IW)	55.00
Rangolite (German)	96+ST	Acetone (Resale)	24.50	Hydrogen Peroxide 50% (Resale)	34.00
Rangolite (Czech.)	80.00	Adipic Acid	85.00	Isopropyl Alcohol	38.00
Rangolite (China)	75.00	Aceto Acetanilide	48.00	Isobutyl Alcohol (Resale)	35.00
Sodium sulphate (Fine)	3.75	Aniline Oil (HOC)	47.00	Monoethanolamine (Resale)	105.00
Sodium sulphate (Coarse)	3.50	Benzoate Plasticiser	62.00	Melamine	62.00
Sodium sulphide 50-52% (Flakes)	11.50+ST	Butyl Acrylate	85.00	Methyl Ethyl Ketone	100.00
		Butyl stearate	38.00	Methyl Isobutyl Ketone	42.00
		Butanol	34.00	Methyl Acrylate	72.00
				Methylene Dichloride (Resale)	21.00

FOR YOUR REGULAR REQUIREMENTS OF:

Butyl Acetate ❄ Octyl Acetate Di Octyl Maleate

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1218, Dalamal Tower, Plot No. 211, Nariman Point, Bombay-400 021

Tel. Nos: 230006, 231192, 233554, 233562

NEW DELHI: G-3, Harsha House, Karampura Commercial Complex, Opp. Milan Cinema, New Delhi 110 015.
Tel: 5455931, Res: 665588

HYDERABAD: Mittal Chambers, Office No. 5, 2-2-51, M.G. Road, Secunderabad 500 003

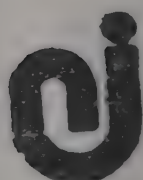
AHMEDABAD: 7, Maharashtra Society, Mithakhali, Ellisbridge, Ahmedabad - 380 006
Tel: 464053, Res: 491877

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ANTIBIOTICS	REPELLANTS	POTASSIUM & SODIUM HYDROXIDE
AMINO ACIDS	PEROMONES	OXALIC ACID
INSECTICIDES	CARDIAC GLYCOSIDES	ESSENTIALS OILS AND
FUNGICIDES	ANTI CANCER DRUGS	AROMATIC PRODUCTS

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Tel.: 251685/252527/253193 Tlx.: 011-3865 Gram: NIRANJAN

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Acetonitrile	Hydroxylamine Sulphate	N. Butyl Amine * N. Butyric Acid
Acetyl chloride	Iso Amyl Alcohol	N. Heptane * N. Propyl Amine
Acrylamide * Acrylonitrile	Iso Butyl Alcohol	Quinoline * P.C.B.A.
Allyl Alcohol	Iso Butyric Acid	Para formaldehyde 84-85%
Alpha Picoline	Iso Propyl Alcohol	Perchloro Ethylene
Butyl Cellosolve * B.H.T.	Lithium Hydroxide	Petroleum Ether 40-60%, 60-80%, 60-95%
Chloroform * Cyclohexane	Magnesium Oxide	Secondary Butanol
Di Methyl Formamide	Malonic Acid	Sodium Methoxide
Di Methyl Sulphoxide	Methyl Cellulose 4000	Soya Lecithin Powder
Epichloro Hydrine	Methyl Cellosolve	Thiourea
Ethylene Dichloride	Methyl Formate	Tri-Chloro Ethylene, T.E.G.
Formic Acid -- 99% & 85%	Morpholine	Tertiary Butyl Alcohol
Hydroxylamine Hydrochloride	Methyl Ethyl Ketone	Xanthone * Zinc dust

H.P.M.C. 5 CPS, 15CPS, 50CPS, 606 CPS

Please Contact: **Rajendra & Company**

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Phone: 321020/335736/344937 Residence: 6124644/6122149

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Phone: 224128

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Carbitol	75.00 + ST
Meta Cresol	45.00
Nitrobenzene	22.00
Nitric Acid (Conc.) (RCF)	2.50
Octanol	48.00
Ortho Cresol	30+ST
Phenol (Resale)	44.00
Propylene Glycol	54.00
Polyethylene Glycol (No.200)	75.00
Polyethylene Glycol (No.400)	75.00
Polyethylene Glycol (No.500)	52.00
Polyethylene Glycol (No.1600)	54.00
Polyethylene Glycol (No.4000)	95.00
Polyethylene Glycol (No.6000)	85.00
Para Cresol	120.00
Styrene Monomer	51.00
Sorbitol	14.00
Sulphuric Acid	2.80
Trichloroethylene	26.00
Triethanolamine (Resale)	95.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	20.00
Vinyl Acetate Monomer	55.00

SOLVENTS	Per Litre
Benzene	14.00
N-Heptane	10.50
N-Hexane	11.00
Methanol	9.25
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	16.50
Xylene	31.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

Alphanaphthylamine	67.00
Alpha Naphthol (Imp.)	170.00
Aceto Acetic Ester (Methyl)	95.00
Ammonium Molybdate	250.00
Anthraquinone	155.00
Anthranilic Acid	100.00
2-Amino 4-Nitrophenol	140.00
Blue B. Base (Local)	330.00
Beta Naphthol (Atul)	64.00
Benzidine Dihydrochloride (BDH)	90.00
Bromamine Acid	540.00
BON Acid (Incl. of excise)	150.00
Chicago Acid (Atul)	340.00
Coach Acid	58.00
C. Acid (Imp.)	195.00
Cyanuric Chloride	165.00
2,4- DNCB	33.00
Dihydrothio PTOS (Imp.)	1,600.00
Dimethyl Aniline	65.00
Diethyl Aniline	125.00
Diamino stilbene	
disulphonic acid	165.00
3,3-DCB	215.00
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Gamma Acid (Local)	140.00
H. Acid (Atul)	145.00
G. Salt	60.00
J. Acid	330.00
J. Acid Urea	460.00
K. Acid	105.00
MPDS (German)	190.00
MNA	120.00

Meta Ureido Aniline	175.00
MPD (Local)	185.00
MPD (German)	190.00
Naphthenic Acid	46.00
N-Methyl J. Acid	510.00
N-Methyl Aniline	125.00
Naphthalene (Refined)	24.00
Ortho Anisidine (OA) (Imp.)	120.00
Ortho Dichloro Benzene (ODCB)	18.00
OT Base	145.00
Para Dichloro Benzene (PDCB)	32.00
Para Anisidine (PA local)	145.00
PNA	110.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	135.00
PNCB (HOC)	53.00
Para Amino Acetanilide	195.00
1-Phenyl 3-Methyl 5-Pyrazolone	142.00
Phenyl J. Acid	370.00
Para Amino Benzoic Acid	125.00
PT Base	133.00
Rhoduline Acid	550.00
Resist Salt 80%	30.00
Resorcinol	300.00
Sodium Naphthionate	67.00
5-Sulpho-Anthranilic Acid	105.00
Sulphanilic Acid	35.00
Sulpho Tobias Acid	140.00
Trichloro Benzene (TCB)	28.00
Tobias Acid (Imp.)	130.00
Metanilic Acid	42.00
MTD (German)	130.00

We Manufacture Chemicals For Industrial Use

- Acetic Acid
- Acetic Anhydride
- Acetaldehyde
- Industrial Alcohol

- Monochloro Acetic Acid
- Ethyl Acetate
- Butyl Acetate

- E D T A
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Ahmedabad : Phone : 78009
Ankleshwar : Phone : 2461-2462
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New Delhi : Phones : 5710733-5711057
Calcutta : Phones : 282474-282475
Telex : 021-7917 SBIL IN
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4949655
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GUANIDINE NITRATE

WITH INTERNATIONAL STANDARD

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Phones: 383109-363545 Telex No.: 011-75847 HITS IN

Bombay Drugs Market

(Prices as on December 5, 1990)

Product	Rs./kg.	Product	Rs./kg.	Product	Rs.
Acriflavine DPC	850.00	Disodium Hydrogen Citrate	43.00	Niacin	200
Aluminium Hydroxide IP	45.00	Ephedrine HCL	1850.00	Niacinamide	230
Ampicillin Trihydrate	1800.00	Erythromycin Estolate	2400.00	Nifedipine	1050
Aminophylline	360.00	Erythromycin Stearate	2150.00	Nitrofurazone	280
Albendazole	2000.00	Ethambutol IP	875.00	Oxyphenbutazone	800
Analgin	280.00	Ethophylline	650.00	Papaverine HCl	2000
Aspirin IP	90.00	Ferrous Fumarate	41.00	Paracetamol	165
Atenolol	2800.00	Folic Acid IP	2800.00	Pectin IP	425
Benzoic Acid IP	34.00	Furosemide IP	2200.00	Pepsin 1:3000	375
Bromine	70.00	Furazolidone IP	385.00	Phenbarbitone	510
Bromhexine HCL	2400	Guanidine Nitrate	40.00	Pheniramine Maleate	1500
Butylated Hydroxy Toluene	650.00	Gallic Acid	320.00	Phenyl Butazone USP	550
Caffeine Citrate IP	390.00	Haloperidone	19,000.00	Piperazine Citrate	110
Caffeine IP	410.00	Hematropine Methyl Bromide	12.00	Piperazine Hexahydrate	100
Calcium Gluconate IP	45.00	Hydrazine Hydrate	92.00	Potato Starch	65
Calcium Glycerophosphate	180.00	Ibuprofen IP	350.00	Propanolol HCl	1250
Calcium Lactate	40.00	Indomethazine	850.00	Pseudoephedrine HCL	2200
Calcium Phenthonate	680.00	I.N.H.	280.00	Pyrazinamide	1200
Cetrimide IP	210.00	Inosite IP	900.00	Ranitidine	2800
Chloramphenicol Powder	1900.00	Iodochloro Hydroxyquinoline	550.00	Rifampicin IP	3900
Chlorbutol	95.00	Lactose IP	40.00	Saccharine Sodium	250
Chlorhexidine Gluconate 20% BP	225.00	Lactic Acid	90.00	Salbutamol Sulphate	7300
Chloroquin Phosphate	830.00	Levamisole	1525.00	Sodium Iodide	425
Chlorpromazine HCL	1500.00	Lignocaine HCl	350.00	Sodium Methoxide	100
Choline Chloride FG	42.00	Lignocaine Base	350.00	Sorbitol Powder	115
Choline Chloride IP	70.00	L. Lysine Feed	95.00	Sorbitol USP	18
Cloxacillin Sodium	2300.00	L. Lysine Pharma	300.00	Sulphacetamide	300
Cimetidine	2100.00	Magnesium Hydroxide	30.00	Sulphamethoxazole	325
Citric Acid IP	45.00	Magnesium Trisilicate IP	12.00	Tinidazole	375
C.P. Maleate	1050.00	Mannitol USP	110.00	Theophylline Anhydrous	370
Cyproheptadine Tcd	9500.00	Mebendazole	620.00	Thiacetazone	290
Diazepam	800.00	Mercurochrome NF	280.00	Tolbutamide	200
Dicyclomine HCl	1450.00	Methyl Chloroformate	85.00	Trimethoprim IP	1050
Diethyl Carbamazine Citrate	300.00	Metochlorpromide TCL	2200.00	Vitamin A Palmitate	3100
Di-iodohydroxyquinoline	500.00	Metronidazole IP	450.00	Vitamin B6 Hydrochloride	1450
Diloxanide Fumarate IP	570.00	Morpholine	115.00	Vitamin B2 5-Phosphate	4100
Diphenhydramine HCL	260.00				

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N-Chlorosuccinamide
N-Bromosuccinamide
Nitromethane
2:6 Dichloro Aniline
Phthalamide
N-Chlorophthalamide
N-ASC (Japan)

3,4,5-Trimethoxy Benzaldehyde
Gallic Acid / D.M.S.O.
Isobutyl Benzene
Alpha Naphthol
Dimethylamine 40%
Picolines (All)
Morpholine

For Rubber Industry

CYCLOHEXYTHEO PHTHALATE (Prevulcanisation Retarder)

Contact:

PHARMA TRADECHEM

543, Kalbadevi Road, Ravindra House, 1st Floor, Bombay 400 002

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Delhi Market

DELHI: DECEMBER 7: NNS Following Gulf crisis coupled with poor import of raw material, the production of boric acid technical had been adversely affected and as a result of poor supply its prices in the local market recorded a rise of Rs. 300 at Rs. 2,400 per 50 kg. Imposition of President's rule in Assam and the State having been declared as a disturbed area and as a result of combing operation by the Army to curb the activities of ULFA, the production in the refineries suffered a setback, consequently paraffin wax jumped up by Rs. 60 at Rs. 1,260 per 50 kg. Residue and slack wax also moved up by Rs. 200 each at Rs. 6,200 and Rs. 13,200 per tonne respectively. Consumers support was reported to be better. Following poor arrivals from Sambhal, Rampur, Barabanki, Chandausi, Amroha and Moradabad areas of U.P. coupled with better support from Maharashtra, M.P. and by local traders, menthol flake, medium and bold jumped up by Rs. 8/10 at Rs. 293, Rs. 310 and Rs. 325 per kg respectively. Mentha oil also recorded a rise of Rs. 10 at Rs. 210 per kg on better consumer support. DMO was reported to be

selling at Rs. 82 per kg against Rs. 80. Ammonia bicarb registered a rise of Rs. 20 at Rs. 215 per 25 kg following poor arrivals coupled with better support from bakeries. As a result of poor supply from Kerala, coupled with better demand, prices of titanium dioxide RC-822 moved up by Rs. 3 at Rs. 87 per kg. RCR-2 titanium remained firm at its previous closing of Rs. 90 per kg while TTP titanium suffered a loss of Re. 1 at Rs. 62 per kg on poor support from paint units. K-brand titanium also drifted lower by Re. 1 at Rs. 58 per kg.

Following poor consumers support, citric acid suffered a loss of Rs. 25/50 at Rs. 2,250/2,425 per 50 kg. As a result of heavy arrivals in the market coupled with poor off-take, chatkolite slipped by Rs. 1.50 at Rs. 64.50 per kg. Following poor support from the gur manufacturers of U.P. sodium hydrosulphite Damo-sha and Kalali slipped by 50 paise at Rs. 49.50 and Rs. 50.50 per kg. Gulshan and Tamil Nadu hydro remained firm at Rs. 46 and Rs. 47 per kg. Rangolite Germany was quoted at Rs. 100 per kg following poor consumers support.

Menthol Flake (Per Kg.)	293
Mentha Oil (Per Kg.)	210
Glycerine (Per Kg.)	53/56
Sodium Silicate (Per quintal)	300/400
Hexamine (Per Kg.)	34
Acetic Acid Glacial (Per Kg.)	17
Copper Sulphate (Per quintal)	2,400/2,600
Formic Acid (Per Kg.)	25
Formaldehyde (Per Kg.)	8
Hydrogen Peroxide (Per Kg.)	32.00/34
Calcium Carbonate (Per Tonne)	2,800/5,800
Acid Slurry Soft (Per Kg.)	42
Acid Slurry Hard (Per Kg.)	35
Phosphoric Acid (Per 50 Kg.)	1,475
Potassium Nitrate (Per quintal)	1,100/1,300
Potassium Permanganate (Per 50 Kg.)	2,600/3,000
Sodium Bichromate (Per 50 Kg.)	1,600
Trisodium Phosphate (50 Kg.)	700
Titanium Dioxide Anatase T.T.P. (Per Kg.)	62
Titanium Dioxide RC-822 (Per Kg.)	87
Titanium Dioxide Anatase K-Brand (Per Kg.)	58
Titanium Dioxide RCR-2 (Per Kg.)	8
Zinc Oxide (Per Kg.)	46.00/50
Phenol Carbolic Acid (Per Kg.)	4
Carbon Tetrachloride (Per Kg.)	2
Chloroform (Per Kg.)	2
Sodium Sulphate (Per metric tonne)	4,150/4,500
Naphthalene Balls (Per 50 Kg.)	1,500
Match Wax	
Residue Wax	6,200

DYES & COLOURS (Per Kg.)

Naphthol AS	175/210
Naphthol ASG	180/240
Naphthol ASBS	210/260
Naphthol ASTR	300/350
Naphthol ASOL	210/250
Naphthol ASBO	195/225

DIRECT DYES (Per Kg.)

Black E. Conc.	120/150
Diazo Black B.T.	105/135
Green B	90/110
Blue 2-B	60/100
Blue 2-B 225% (JNR)	1
Sky Blue FB	160/200
Basic Auramine	55/110
Basic Rhodamine	315/400
Basic Methylene Blue	100/120
Basic Violet	165/200
Basic Malachite Green	1
Acid Orange	75/100
Congo Red H/C	85/100

(DELHI MARKET RATES AS ON DECEMBER 7, 1990)

Ammonia Bicarb (Per 25 Kg.)	215.00	Tartaric acid France (Per Kg.)	314.00
Mercury (Per flask)	11,000.00	Sufolite (Per Kg.)	71.00
Soda ash (Per bag)	375/385.00	Chatkolite (Per Kg.)	64.50
Ammonium Chloride (50 Kg.)	140/180.00	DMO (per Kg.)	82.00
Caustic soda flakes (50 Kg.)	575.00	Boric acid Technical (Per 50 Kg.)	2,400.00
Citric acid (Per 50 Kg.)	2,250/2,425.00	Paraffin Wax (Per 50 Kg.)	1,260.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	101.00	Slack wax (Per metric tonne)	13,200.00
Stable Bleaching Powder KCI (Per 25 Kg.)	90.00	Tartaric Acid (France Per Kg.)	314.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	91.00	Tartaric Acid (Swastik Per Kg.)	210.00
Stable Bleaching Powder Modi (Per 25 Kg.)	92.00	Borax Granular (Per 50 Kg.)	950.00
Sodium Bicarbonate (50 Kg.)	325/350.00	Borax Crystal (Per 50 Kg.)	950.00
Sodium Hydrosulphite (Per Kg.)	46/50.50	Sodium Nitrite (Per 50 Kg.)	875/1,000.00
Rangolite (Per Kg.)	100.00	Sodium Nitrate (Per 50 Kg.)	520.00
		Camphor Thal (Per Kg.)	115.00
		Camphor Powder (Per Kg.)	102.00
		Menthol Bold (Per Kg.)	325.00
		Menthol Medium (Per Kg.)	310.00

Madras Market

Markets were not enthusiastic. After an initial spurt in the prices of ammonium bicarbonate, the prices stabilised at Rs. 170 per bag of 25 kgs. Caustic prices ruled firm at Rs. 11,200 to Rs. 11,000 per MT.

MEK continues to be in short supply and the prices rate high. There is no change in the prices of soda ash and other solvents. There were many enquiries for DEG, the stocks of which have not reached Madras.

(MADRAS MARKET RATES AS ON DECEMBER 8, 1990)

Acetic Acid Glacial (per kg)	15.50	Hydrosulphite of Soda (BASF) (per kg)	46.00
Ammonium Sulphate Iron free (per MT)	4,000.00	Hexamine (per kg)	35.00
Ammonium Bicarbonate (per 25 kgs)	175.00	Hyflosupercell (per kg)	28.00
Ammonium Chloride (per MT)	3,000.00	Hydrogen Peroxide (per kg)	38.00
Alum Slurry (per kg)	35.00	Litharge (per kg)	42.00
Ammonium Carbonate (per kg)	10.00	Lead Acetate (per kg)	40.00
Ammonium Chloride (per kg)	9.00	Magnesium Carbonate (per kg)	16.00
Formic Acid Technical (per kg)	28.00	Magnesium Chloride (per kg)	4.00
Bleaching Powder (per 50 kgs)	220.00	Maleic Anhydride (per kg)	40.00
Borax (per 50 kgs)	800.00	Menthol Crystals (per kg)	400.00
Caustic Soda Flakes -- Metturr Chemicals (per MT)	11,200.00	Oxalic Acid (per kg)	17.00
Caustic Soda Flakes -- Andhra Sugars (per MT)	11,200.00	Paraffin Wax (per kg)	26.00
Calcium Chloride 70% Solid (per MT)	3,500.00	Potassium Bichromate (per kg)	40.00
Calcium Chloride Anhydrous (per MT)	6,000.00	Phosphoric Acid (per kg)	32.00
Calcium Carbonate (Activated) (per MT)	7,000.00	Polyvinyl Alcohol Powder (per kg)	150.00
Calcium Carbonate (Precipitated) (per MT)	6,000.00	Pentaerythritol (per kg)	55.00
Nitric Acid (per kg)	48.00	Phthalic Anhydride (per kg)	48.00
Copper Sulphate (per kg)	25.00	Soda Ash (TAC) (per 75 kgs)	380.00
Cresylic Acid 98-99% (per kg)	140.00	Soda Ash (TATA) (per 75 kgs)	410.00
Cure Para Cresol 96% (per kg)	110.00	Sodium Bicarbonate (TATA) (per 50 kgs)	390.00
Meta Para Cresol 42% (per kg)	55.00	Sodium Silicate (per MT)	4,500.00
Formic Acid (per kg)	27.00	Sodium Bichromate (per kg)	35.00
Formaldehyde (per kg)	8.00	Sodium Nitrate (per kg)	8.00
Glycerine I.W. (per kg)	49.00	Sodium Nitrite (per kg)	24.00
Hydrosulphite of Soda (TCPL) (per kg)	42.00	Sodium Sulphide Flakes (per kg)	20.00
Hydrosulphite of Soda (IDI) (per kg)	45.00	Sodium Bisulphite (per kg)	8.00
		Sodium Alginate (per kg)	300.00
		Sodium Acetate (per kg)	8.00
		Sodium Sulphate (Anhydrous) (per kg)	4.20
		Titanium Dioxide (Anatase) (per kg)	65.00
		Titanium Dioxide (Rutile) (per kg)	85.00
		Trisodium Phosphate (per kg)	10.00
		Urea (Technical) (per kg)	3.00
		Zinc Oxide (per kg)	54.00

CALCUTTA MARKET (Prices as on Dec. 9, 1990)

Acetic acid (per 50 kg)	725.00
Basic chrome sulphate (per 50 kg)	850.00
Benzene (litre)	14.00
Bleaching powder (bag)	230.00
Borax granular (per 50 kg)	NA
Boric acid (per 50 kg)	1,700.00
Camphor (per kg)	107.00
Caustic soda solid	NA
Caustic soda flakes (per 50 kg)	575.00
Glycerine (per kg)	52.50
Menthol bold (per kg)	350.00
Menthol medium (per kg)	325.00
Menthol small (per kg)	275.00
Phosphoric acid (per 50 kg)	1,400.00
Phenol (per kg)	42.00
Soda ash (75 kg)	395.00
Sodium bichromate (per 50 kg)	3,250.00
Sodium bicarbonate (per 50 kg)	375.00
Sodium nitrate (per 50 kg)	450.00
Sodium sulphate anhydrous (per 50 kg)	NA
Sulphuric acid (per ton)	2,200.00
Trisodium phosphate (per 50 kg)	375.00
Toluene (litre)	18.00

Zinc Chloride Powder (per kg)	14.00
Zinc Sulphate (per kg)	9.00

SOLVENTS

Acetone -- HOCL (per kg)	23.00
Butanol (per kg)	39.00
Butyl Acetate (per kg)	39.00
Benzene (per lit)	17.00
Cellosolve (per kg)	65.00
Carbon Tetra Chloride (per kg)	22.00
Chloroform (per kg)	28.00
Diacetone Alcohol (per kg)	34.00
Diethylene Glycol (per kg)	42.00
Dichloroethane (per kg)	20.00
Di-octyl Phthalate (per kg)	65.00
Di-N-butyl Phthalate (per kg)	65.00
Ethyl Acetate (per kg)	25.00
Isopropyl Alcohol (per kg)	33.00
Methanol (per kg)	12.00
Methylene Chloride (per kg)	23.00
Methyl Ethyl Ketone (per kg)	80.00
Methyl Isobutyl Ketone (per kg)	48.00
Phenol (per kg)	46.00
Sorbitol (per kg)	15.00
Triethanolamine (per kg)	100.00
Trichloroethylene (per kg)	26.00
1-1-1 Trichloroethane (per kg)	29.00
Turpentine (per lit)	16.00
Toluene (per lit)	18.00
Xylene (per lit)	30.00

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

Due Date (1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Appro sailing (5)
20/12	Prospect	Killick	S. American Ports. (Carting at Hay Bunder No. 5).	24/12
14/12	Ahelers Breeze (Voy-911)	Marine Trans/ Ranadip/ M.C.S./ Arebee	Boston; New York; Baltimore; Norfolk; Charleston; Port Everglades; Jacksonville; Galveston; Houston; Los Angeles; Toronto; Montreal; Philadelphia; Savannah; New Orleans; South & Central American Ports. (Carting at T.P. No. 3). New York; (Elisabeth); Portsmouth (Norfolk); Baltimore; Charleston; Boston; Philadelphia; Houston; New Orleans; Jacksonville; Savannah; Wilmington (N.C.); Mobile; P. Everglades; (Miami); Los Angeles; (Long Beach); Oakland; Portland; Seattle; Anchorage; Montreal; Qubec; Ontario; Toronto; Via Halifax; Vancouver; Detroit Also Caribbean & Mexican Ports. (Carting at M.O.D. No. 2). Savannah; New York; Baltimore; Wilmington; Houston; Galveston; Los Angeles; Longbeach; Boston; Norfolk; Charleston; Jacksonville; Miami; Tampa; New Orleans; Providence; San Diego; Oakland; San Francisco; Stockton; Chicago; Detroit; Cleveland; Milwaukee; Columbus; Kansas City; Atlanta; Nashville; Dallas; Minneapolis. (Carting at E-Grain Depot). Halifax; Montreal; Toronto; Los Angeles; Oakland; San Francisco; San Diego; New York; Baltimore; Boston; Charleston; Chicago; Dallas; Houston; Jacksonville; Miami; Norfolk; Philadelphia; Savannah; San Juan; Tijuana; Carribbean & Central American Ports. (Carting at M-Jetha C.D.).	19/12
22/12	CMB Merzario (Nhava Sheva)	C.M.B.	Norfolk; New York; Baltimore; Philadelphia; Charleston; Savannah; Houston; Miami; New Orleans Via Antwerp; Montreal; Toronto; Halifax. (Carting at Kalamboli).	24/12
19/12	Lanka Aruna	Seahorse	New York; Baltimore; Charleston; Norfolk. (Carting at M.O.D. No. 3).	23/12
17/12	Susak (V-10/90)	Oceanic	New York; Baltimore; Philadelphia; Chicago; Boston; Norfolk; Atlanta; Charleston; Savannah; Miami; Houston & Other inland destinations in U.S. East Coast & S. American Ports. (Cartg. at Wadi Bunder No. 3).	20/12
14/12	Maersk Clementine (Voy-9024)	Maersk Agency	New York; Philadelphia; Baltimore; Norfolk; Charleston; Savannah; Jacksonville; Miami; New Orleans; Houston; Toronto; Montreal; Chicago; Atlanta; Denver; Dallas; Wilmington; Milwaukee; Detroit; Minneapolis; Memphis; Nashville; Cleveland; Phoenix; Boston; Los Angeles; Vancouver; Seattle; San Francisco; Portland; Long Beach; Mexican & S. American Ports. (Carting at 19-ID).	19/12
12/12	Ocean Sincerity (V-29A/B)	O.S.A.	New York; Baltimore; Philadelphia; Houston; Boston; Chicago; Dallas; Atlanta; Savannah; Norfolk; Charleston; Los Angeles; San Francisco; Oakland; Seattle; Vancouver; Toronto; Montreal; Portland; Tacoma & S. American & W. Indies Ports. (Carting at B. Pier Extn.)	20/12
14/12	Contship Asia	Samrat/ Hindustan/ L. Triest	Boston; New York; Baltimore; Norfolk; Charleston; P. Mouth; P. Lauderdale; Miami; New Orleans; Savannah; Jacksonville; P. Everglades; Philadelphia; Halifax; Montreal; Toronto & S. American Ports. (Carting at M.O.D. No. 1 for Samrat & Hindustan) (Carting at M-171/173 C.D. for L. Triest).	20/12
22/12	Hoegh Clipper (Bahamas)	Patvolk	Montreal & Toronto Via Halifax; New York; Boston; Norfolk; Charleston; Houston; Savannah; Wilmington; Philadelphia; Baltimore; New Orleans; & FCL Chicago; Milwaukee; Atlanta; Dallas. (Carting at H.B. No. 5).	27/12
22/12	CMB Merzario (Nhava Sheva)	C.M.B.	Lagos; Abidjan; Lome; Douala; Matadi; Port. Gentil; Pointe Noire; Nouakchott; Cotonou; Dakar; Luanda; Monrovia; Tema via Antwerp. (Carting at Kalamboli).	24/12
25/12	Menkar (Cyp) (Voy-010)	Arebee	Lagos/Apapa; P. Harcourt; Abidjan; Tema; Takoradi; Lome; Freetown; Cotonou; Douala; Matadi. (Carting at M-178/180 Cotton Depot).	29/12
14/12	Contship Asia	L. Triest	With T.P. Lagos/Apapa; Abidjan; Dakar; Douala; Cotonou; Nouakchott; Libreville; Matadi; Conakry; Freetown. (Carting at M-171/173 Cotton Depot).	20/12

	(2)	(3)	(4)	(5)
2	Ahlers Breeze (V-911) (Belg)	Marine Trans/ M.C.S./ Ranadip/ Patvolk/ L. Triest/ Mackintosh/ Arebee	Antwerp; Rotterdam; Hamburg; Bremen; Le Havre; Felixstowe; Hull; Rostock; London; Liverpool; Avonmouth; Copenhagen; Gothenburg; Aarhus; Oslo; Stockholm; Helsinki; Malmao; Norkopping; Helsinburg; (including inland destinations for above ports); Lattakia; Mimmassol; Izmir; Mersin; Istanbul; Beirut; Quzai; Marseilles; Valencia; P. Said; Casablanca; Alexandria; Piraeus; Soloniki; Iraqi Ports. (Carting at T.P. No. 3). Jeddah; Genoa; Felixstowe; Hamburg; Rotterdam; Antwerp; Le Havre; Gdansk; Lisbon; Aarhus; Copenhagen; Gothenburg; Oslo. (Carting at E-Grain Depot). Jeddah; Palermo; Naples; Livorno; (Leghorn); Marseilles (Fos); Barcelona; Bilbao; Valencia; Alicante; Algeciras; Lisbon; Leixoes; Bremerhaven; Le Havre; Antwerp; Rotterdam; Bremen; Hamburg; Aarhus; Piraeus; Gothenburg; Oslo; Copenhagen; Stockholm; Helsinki; Felixstowe; Tilbury; London; Avonmouth; Dublin; Belfast; Grangemouth; Liverpool; Manchester; Istanbul; Izmir; Valetta; (Malta). (Carting at M.O.D. No. 2). Genoa; Marseilles; Le Havre; Antwerp; Rotterdam. (Crtg. at HB No. 4). Barcelona; Marseilles. (Carting at M-171/173 Cotton Depot). Aqaba; Hodeidah; Aden; Jeddah. (Carting at T.P. No. 4). P. Said; Alexandira; Piraeus; Venice; Trieste; Genoa; Koper; Naples; Fos; Marseilles; Baelona; Valencia; Ravenna; Livorno; Las Palmas; Limmasol; Constanza; Budapest. (Carting at M-178/180 Cotton Depot).	19/12
12	Menkar	P&O	Assab; Djibouti; P. Sudan. (Carting at Timber Pond No. 1).	29/12
12	Susak (Yug)	Oceanic/ L. Triest	Jeddah; P. Said; Rijeka; Trieste; Venice; Med. Ports. (Crtg. at W.B. 3) No. 3). Trieste; Venice; Ravenna; Rijeka; Koper; Ancona. (Carting at M-171/173 Cotton Depot).	20/12
2	Lanka Aruna (Phi)	Seahorse	Felixstowe; London; Liverpool; Manchester; Avonmouth; Dublin; Glasgow; Wembley; Leicester; Immingham; Birmingham; Leeds; Antwerp; Bremen; Copenhagen; Gothenburg; Hamburg; Rotterdam; Oslo; Stockholm; Helsinki; Aarhus; Malmao; Norkopping. (Carting at M.O.D. No. 3).	23/12
12	Maersk Clementine	Maersk Agency	Leghorn; Marseilles; Naples; Barcelona; Bilbao; Bordeaux; Alicante; Genoa; Valencia; Bremen; Jeddah; Antwerp; Rotterdam; Bremerhaven; Hamburg; U.K. & Scandinavian Ports. (Carting at 19-ID).	19/12
12	CMB Merzario (Nhava Sheva)	C.M.B./ Merzario	Port Sudan; Jeddah; La Spezia; Valencia; Genoa; Barcelona; Marseilles; Tunis; Casablanca; Tangier; Alexandria; Piraeus; Mersin; Limmassol; Felixstowe; London; Liverpool; Manchester; Birmingham; Avonmouth; Dublin and all inland destinations in U.K.; Antwerp; Rotterdam; Hamburg; Bremen; Leixoes; Lisbon; Copenhagen; Oslo; Gothenburg; Stockholm; Malmao; Aarhus; Helsinki. (Crtg. at Kalamboli for both).	24/12
12	Contship Asia (Ger)	Samrat/ Hindustan/ Killick/ L. Triest	Felixstowe; Hamburg; Rotterdam; Also London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembly; Birmingham; Leicester; Le Havre; Bremen; Amsterdam; Antwerp; Copenhagen; Leeds; Aarhus; Gothenburg; Oslo; Helsinki; Stockholm; Belfast & all destination in U.K., Benelux; Germany; France; Switzerland and Austria; Barcelona; Marseilles; La Spezia; Livorno; (Leghorn); Genoa; and other Italian ports and FCL only Beirut; Alexandria; Valletta; Limmassol; Larnaca; Lattakia; Mersin; Izmir. (Carting at M.O.D. No. 1 for Samrat & Hindustan). Felixstowe; Rotterdam; Hamburg; Antwerp; Le Havre; Lisbon; Leixoes; London; Liverpool; Manchester; Bristol; Avonmouth; Leeds; Glasgow; Tilbury; Birmingham; Dublin; Belfast; Bremen; Bremerhaven; Aarhus; Copenhagen; Gothenburg; Helsinborg; Oslo; Helsinki; Alexandria; Lattakia; Mersin; Malta; Limmassol; Piraeus. (Carting at E-Shed Grain Depot). Felixstowe & U.K. Inland Destinations; Hamburg; Rotterdam & Inland Destinations in Cont; Genoa; Leghorn; La Spezia; Naples; with TP Las Palmas; Santacruz; De Teneriffe; Malta; Limmassol; Alexandria; Tunis; Benghazi. (Carting at M-171/173 Cotton Depot).	20/12
12	Moscenice	Oceanic	Jeddah; P. Said; Rijeka	28/12
12	Menkar	P&O	Colombo; Chittagong. (Carting at T.P. No. 1).	29/12

(1)	(2)	(3)	(4)	(5)
19/12	Lanka Aruna	Seahorse	Colombo. (Carting at M.O.D. No. 3).	23/
22/12	CMB Merzario	Links Int.	Afghanistan. (Carting at Kalamboli).	24/
20/12	Prospect	I.M.E./Killick/ P&O	Singapore. (Carting at W.B. No. 3 for I.M.E.) (Carting at H.B. No. 5 for Killick) (Carting at T.P. No. 1 for P&O).	24/
14/12	Maersk Clementine	Maersk Agency	Penang; Singapore; Hongkong; Keelung; Kaohsiung; Busan; Main Japan Ports; Manila; Jakarta; Surabaya; Bangkok; P. Kelang; Chinese Ports. (Carting at 19-ID).	19/
14/12	Ahlers Breeze	Marine Trans/ M.C.S./ Ranadip	Singapore; Hongkong; Busan; Kobe; Tokyo; Djakarta. (Crtg. at T.P. 3). Far East & Japan Ports. (Carting at E-Grain Depot). Far East & Japan Ports. (Carting at M.O.D. No. 2).	19/
19/12	Lanka Aruna	Seahorse	Singapore; Penang; P. Kelang; Bangkok; Hongkong; Keelung; Kobe; Yokomama & FCL only Busan; Inchon; Osaka; Tokyo; Nagoya; Kaohsiung. (Carting at M.O.D. No. 3).	23/
12/12	Ocean Sincerity (V-29 A/B) (Lib)	O.S.A./ M.S.P.L.	P. Kelang; Singapore; Kaohsiung; Hongkong; Bangkok; Kobe; Yokohama; Nagoya; Moji; Osaka; Busan; Tokyo; Shimizu; Keelung; Tsingtao; Quindao; Xiangang; Shanghai. (Carting at B. Pier Extn.). Singapore; Bangkok; P. Kelang; Penang; Jakarta; Ho Chi Minh; Kaohsiung; Busan. (Carting at E-Shed Grain Depot).	20/
11/12	Nikolay Semashko	Transocean	Singapore; Main Japan Ports.	21/
20/12	Prospect (V-9) (Phi)	I.M.E./ Killick/ P&O	Sydney; Melbourne; Adelaide; Fremantle; Brisbane; Auckland; Wellington; Lyttelton. (Carting at Wadi Bunder No. 3). Melbourne; Sydney; Brisbane; Adelaide; Fremantle; P. Hobart; Devon P.; Launceston; Burnie; New Plymouth; Auckland; Wellington; Lyttelton; P. Chalmers; Christchurch; Dunedin; Napier; Also Western Samoa; Papua; New Guinea; Solomon Island; American Samo; Tonga; New Calidonia; P. Villa. (Carting at Hay Bunder No. 5 for Killick) (Carting at Timber Pond No. 1 for P&O).	24/
14/12	Ahlers Breeze	M.C.S.	Sydney; Melbourne; Brisbane; Burnie; New Castle. (Crtg. at E-G.D.).	19/
19/12	Lanka Aruna	Seahorse	Brisbane; Fremantle; Sydney; Melbourne; Adelaide. (Crtg. at MOD 3).	23/
12/12	Ocean Sincerity	O.S.A.	Sydney; Melbourne; Adelaide; Brisbane; Fremantle; Auckland; Wellington; Lyttelton; P. Chalmers. (Carting at B. Pier Extn.)	20/
14/12	Maersk Clementine	Maersk Agency	Dubai; Dammam; Muscat; Bahrain; Riyadh; Doha. (Carting at 19-ID).	19/
14/12	Ahlers Breeze	Ranadip	Dubai; Muscat; Abu Dhabi; Doha; Dammam; Bahrain. (Carting at M.O.D. No. 2).	19/
15/12	Saadi (Iranian)	J.M. Baxi	Bandar Abbas.	19/
16/12	Ermioni (Cyp)	Jades Ship	Dubai.	24/
14/12	Bismi	Unimarine	Muscat; Dubai.	21/
15/12	Ghantout One	Sitara	Dammam.	22/
14/12	Kapitan Medvetski	Sai Ship	Mombasa; Dar Es Salaam. (Carting at E-Shed Grain Depot).	20/
25/12	Menkar (V-10) (Cyp)	Arebee/ P&O	Dar Es Salaam & Mombasa (Direct); Kampala; Jinja; Tororo; Lugazi; Entebbe (Uganda); Kigali (Rwanda); Kitwe; Lusaka; Ndola (Zambia); Lilongwe; Blantyre (Malawi); Maputo; Zanzibar. (Carting at M-178/180 Cotton Depot). Mombasa; Dar Es Salaam (Direct); Beira; Mahe; & Inland Destinations in East Africa. (Carting at Timber Pond No. 1).	29/
24/12	Vishva Kaumudi	S.C.I.	Seychelles; P. Louis; Mombasa; Dar Es Salaam; (Beira) & Tamatave Via P. Louis.	31/

VESSELS DUE FOR IMPORT DISCHARGE

Due Date	Steamer's Name	Agents	From
19/12	Asean Honour	Swanship	Malaysia
28/12	Bhavabuti	S.C.I.	Black Sea & Med. Ports.
22/12	CMB Merzario (Nhava Sheva)	CMB	U.K., Cont./U.S., Med. Ports.
22/12	Hoegh Clipper	Patvolk	U.S.A.
22/12	Jala Gouri	S.C.I.	Japan/Far East
19/12	Lanka Aruna	Seahorse	U.K. Cont.
20/12	Prospect (V-9)	I.M.E./P&O/Killick	Australia/New Zealand & Gulf
28/12	S/o. Manipur	S.C.I.	U.S. Canada
27/12	Taipan	Parekh	Cont.
22/12	Vishva Parijat	S.C.I.	U.K. Cont./U.S.
30/12	Vishva Tarang	S.C.I.	U.K. Cont.

Materials Imported/Exported

Import values are c.i.f. Export values are f.o.b. port

MATERIALS EXPORTED BOMBAY

(From 19.3.90 To 28.3.90)

(Continued from previous issue)

POTASSIUM NITRATE: To Dubai: R Exports, 10,000 Kgs., Rs. 1,24,000.

RED OXIDE: To Daressalaam: James International, 60,000 Kgs., Rs. 75,000.

SILICON GEL BLUE: To Dubai: B Exports, 4,000 Kgs., Rs. 1,60,000.

SODIUM BICARBONATE: To rare: Tata Chemicals Ltd., 18 Mts., Rs. 90,995.

SODIUM CYANIDE: To La Guaira: Cyanides & Chem. Co., 61,930 Kgs., Rs. 19,45,180.

SODIUM HYDRO SULPHITE: To Antwerp: Transpek Industry Ltd., 10,000 Kgs., Rs. 9,44,883; To Charleston: Products and Produce Pvt. Ltd., 10,000 Kgs., Rs. 3,40,426; Transpek Industry Ltd., 18,144 Kgs., Rs. 3,52,000; To Izmer: Transpek Industry Ltd., 36,000 Kgs., Rs. 6,18,212; To La Spezia: Transpek Industry Ltd., 3,000 Kgs., Rs. 52,954.

SODIUM HYDROSULPHITE: To Antwerp: Transpek Industry Ltd., 10,000 Kgs., Rs. 9,44,883.

SODIUM HYDROSULPHITE 92%: To Charleston: Transpek Industry Ltd., 18,144 Kgs., Rs. 3,52,000.

SODIUM HYDROSULPHITE 88%: To La Spezia: Transpek Industry Ltd., 31,200 Kgs., Rs. 5,65,686.

SODIUM NAPHTHIONATE: To Antwerp: Saahil Ind., 5,556 Kgs., Rs. 2,43,829.

SODIUM PENTACHLOROPHENATE: To Antwerp: Excel Inds. Ltd., 10,000 Kgs., Rs. 4,88,510.

MONO SODIUM PHOSPHATE: To Bangkok: Mangalya Trading & Invest-

ment Ltd., 1,000 Kgs., Rs. 30,100.

SULFANILIC ACID: To Bangkok: Sudha Indl. Corpn., 3,000 Kgs., Rs. 66,945; To Busan: Jeevan Products, 10,000 Kgs., Rs. 2,03,744; To Milan: Priya Electronics & Chemicals, 3,000 Kgs., Rs. 57,765.

SULFO ANTHRANILIC ACID: To Bangkok: Vivid Exports, 1,352.95 Kgs., Rs. 86,435; To Keelung: Jay Chemical Inds., 2,949.8 Kgs., Rs. 1,38,000.

META UREIDOANILINE: To Bangkok: Vivid Exports, 1,450 Kgs., Rs. 1,34,413.

VINYL SULPHONE ACETANILIDE: To Busan: Shyam Intermediates, 3,150 Kgs., Rs. 2,76,596; National Organic Chemical Inds., 12,850 Kgs., Rs. 94,177.

VINYL SULPHONE: To Busan: NOCIL, 6,350 Kgs., Rs. 4,96,736.

VITAMIN C BP/USP: To Hamburg: Ambalal Sarabhai Enterprises, 5,000 Kgs., Rs. 7,12,128.

YELLOW OXIDE: To Jeddah: Selective Minchem & Colour Inds., 8,400 Kgs., Rs. 65,459.

ZINC OXIDE: To Singapore: Metaxinc India Ltd., 18,000 Kgs., Rs. 3,69,362.

ZINC PHOSPHIDE TECH 80% MIN: To Bangkok: United Phosphorous Ltd., 5,000 Kgs., Rs. 3,12,670.

DYE MATERIALS EXPORTED BOMBAY (From 19.3.90 To 28.3.90)

ARYLAMIDE ORANGE: To Colombo: Sudarshan Chemical Ind. Ltd., 200 Kgs., Rs. 37,060; To Hong Kong: Sudarshan Chemical Ind. Ltd., 3,000 Kgs., Rs. 57,251.

ARYLAMIDE YELLOW 52: To Colombo: Sudarshan Chemical Ind. Ltd., 200 Kgs., Rs. 32,610.

ACID BLACK: To Felixstowe: Sarabhai Intl., 1,000 Kgs., Rs. 1,14,966.

ACID BLACK 113: To Liverpool: Formokem (India) Corpn., 2,000 Kgs., Rs. 2,45,000.

ACID GREEN 16: To Genoa: Liberty Exports Ltd., 500 Kgs., Rs. 1,55,745.

ACID RED 1: To New York: Priya Electronics & Chem. Ltd., 2,000 Kgs., Rs. 1,53,095.

ACID RED 35: To Keelung: Ravi Chem Dye, 1,000 Kgs., Rs. 96,866.

ACID SCARLET GDL: To Singapore: Golden Dyes Corpn. Pvt. Ltd., 1,500 Kgs., Rs. 72,700.

AMARYL YELLOW 4R: To Colombo: Amritlal Chemaux Ltd., 200 Kgs., Rs. 27,150.

AURAMINE O CONC. ACID BLUE: To Buenos Aires: Ravi Chem Dye, 400 Kgs., Rs. 95,132.

BLACK FBRR: To Singapore: Colour Chem Ltd., 500 Kgs., Rs. 10,774.

BLUE FFG EX. CONC: To Bangkok: Colour Chem Ltd., 200 Kg., Rs. 14,099.

BORDEAUX FRN: To Penang: Colour Chem Ltd., 200 Kgs., Rs. 20,831.

BORDEAUX FRN EX. CONC: To Colombo: Colour Chem Ltd., 150 Kgs., Rs. 7,768.

BORDEAUX GP BASE: To New York: Monarch Dyestuffs Inds., 1,200 Kgs., Rs. 2,05,957.

BRACTOZOL TURQUOISE BLUE G: To Busan: Blue Rock Dyes & Chems. Pvt. Ltd., 1,000 Kgs., Rs. 1,07,234.

BRACTOZOL YELLOW: To Antwerp: Blue Rock Dyes & Chemicals Pvt. Ltd., 3,000 Kgs., Rs. 4,59,573.

BRACTOZOL YELLOW 3RS: To Hong Kong: Blue Rock Dyes & Chem. Pvt. Ltd., 500 Kgs., Rs. 68,085.

CHEMICTIVE YELLOW: To Antwerp: Chemiequip Ltd., 575 Kgs., Rs. 92,979.

CHROMAZOL TURQUOISE BLUE G: To Hamburg: Blue Rock Dyes & Chem Ltd., 1,000 Kgs., Rs. 1,14,043.

DIRECT BLACK 38: To Genoa: Metro Chem Industries, 8,000 Kgs., Rs. 7,82,839.

DIRECT BLUE 2B: To Jakarta: Uni Impex India, 1,500 Kgs., Rs. 71,096.

DIRECT BLUE 86: To Rotterdam: Ravi Chem Dye, 1,500 Kgs., Rs. 1,39,954.

DIRECT BRILLIANT VIOLET: To New York: Indokem Ltd., 3,000 Kgs., Rs. 6,73,958.

DIRECT GREEN B: To Rotterdam: Vilia Chemicals Pvt. Ltd., 1,000 Kgs., Rs. 78,000.

DIRECT GREEN B DIRECT BROWN MR: To Jakarta: Rama

Exports, 3,000 Kgs., Rs. 2,33,991.

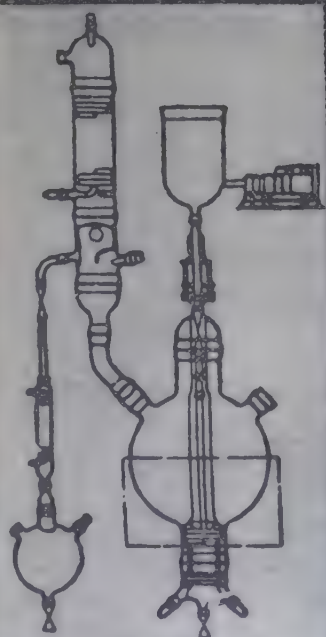
DIRECT TURQ BLUE: To Rotterdam: Priya Electronics & Chemicals, 1,000 Kgs., Rs. 69,691.

DYE INTERMEDIATES: To Antwerp: Jindal Dye Intermediate Pvt. Ltd., 20,000 Kgs., Rs. 6,26,808; Monarch Dyestuffs Inds., 2,600 Kgs., Rs. 1,36,207; Saahil Intl., 6,424 Kgs., Rs. 2,67,506; To Bangkok: Indian Dyestuff Inds. Ltd., 500 Mts., Rs. 1,94,000; Virton Intermediates Pvt. Ltd., 19,554.64 Kgs., Rs. 15,04,340; To Bremen: BASF India Ltd., 1,000 Kgs., Rs. 3,55,000; To Buenos Aires: Priya Chemicals, 4,200 Kgs., Rs. 4,46,727; To Busan: Aarti Organics Pvt. Ltd., 2,500 Kgs., Rs. 28,100; Gujarat Dyestuff Inds., 9,358.30 Kgs., Rs. 7,37,021; Mangalya Trading & Inv. Ltd., 7,000 Kgs., Rs. 6,65,000; Metro Chem Industries, 3,183.60 Kgs., Rs. 2,79,880; Zenith Ltd., 2,650 Kgs., Rs. 1,74,090; To Felixstowe: Jeevan Products, 14,000 Kgs., Rs. 5,91,232; To Hamburg: Jindal

Dye Intermediate Pvt. Ltd., 4,112.6 Kgs., Rs. 7,22,211; Liberty Exports Ltd., 15,000 Kgs., Rs. 3,45,691; Priya Chemicals, 1,900 Kgs., Rs. 1,58,600; Priya Electronics & Chemicals, 3,200 Kgs., Rs. 22,385; To Jakarta: Espirito Santo Chemicals, 5,300 Kgs., Rs. 4,54,000; 1,350 Kgs., Rs. 1,08,843; Goodwin Chemical Inds., 18,000 Kgs., Rs. 4,29,632; Hub Dyes & Chem Pvt. Ltd., 10,695 Kgs., Rs. 9,82,979; Istanbul: Jindal Dyes & Intermediates Pvt. Ltd., 15,394.9 Kgs., Rs. 7,37,600; To Istanbul: Sajan Impex Pvt. Ltd., 15,000 Kgs., Rs. 11,70,953; To Kolko: Metro Chem Industries, 7,534 Kgs., Rs. 5,58,889; Monarch Dyestuffs Inds., 3,024 Kgs., Rs. 62,979; to Keelung: Priya Chemicals, 2,650 Kgs., Rs. 2,32,486; Vivid Exports, 2,314 Kgs., Rs. 1,66,280; To Leeds: Sand (I) Ltd., 3,750 Kgs., Rs. 4,62,128; London: Sate Chem Pvt. Ltd., 3613.2 Kgs., Rs. 3,73,130; To Manchester: Sadhana Nitrochem Ltd., 5,000 Kgs., Rs. 1,28,210; To Milano: Priya Electronics & Chemicals, 6,400 Kgs., Rs. 4,37,553; To New York: Acme Chemical, 16,000 Kgs., Rs. 10,48,000; Atul Products Ltd., 11,500 Kgs., Rs. 10,37,174; To Nagoya: R.D. Enterprises, 5,000 Kgs., Rs. 1,35,000; New York: Textile Auxiliaries & Chemicals, 990 Kgs., Rs. 1,30,042; Visi Intermediates Pvt. Ltd., 16,042.78 Kgs., Rs. 13,37,787; To Odessa: Bu Enterprises, 9,484.900 Kgs., Rs. 18,91,500; Sharda International, 20,983.900 Kgs., Rs. 27,65,000; Osaka: Metro Chem Inds., 1,087 Kgs., Rs. 3,88,425; To Singapore: Sum International, 2,500 Kgs., Rs. 2,83,910.

DYES: To Antwerp: Jindal Dye Intermediate Pvt. Ltd., 3,000 Kgs., Rs. 1,96,861; Monarch Dyestuff Inds., 5,000 Kgs., Rs. 3,11,623; Vipul Dyes & Chemicals Pvt. Ltd., 1,000 Kgs., Rs. 1,83,830; To Bangkok: IDI Ltd., 2,800 Kgs., Rs. 8,04,000; Jay Chemical Inds., 20,000 Kgs., Rs. 15,87,000; 12,300 Kgs., Rs. 24,16,124; Miv Overseas Corp., 3,000 Kgs., Rs. 4,11,915; To Buenos Aires: Rama

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hem Dye, 200 Kgs., Rs. 30,125; To
usan: Amar International, 5,000 Kgs.,
Rs. 51,064; Associated Intermediates &
hem., 5,000 Kgs., Rs. 7,40,000;
000 Kgs., Rs. 1,26,000; Mahalaxmi
chemical Works, 1,200 Kgs.,
Rs. 3,95,745; Monarch Dyestuffs Inds.,
000 Kgs., Rs. 1,13,191; Space Intl.,
000 Kgs., Rs. 2,37,021; To Bremen:
shish Chemicals, 1,000 Kgs.,
Rs. 1,61,957; To Charleston: Atul Pro-
ducts Ltd., 7,800 Kgs., Rs. 2,30,161;
Monarch Dyestuff Inds., 12,000 Kgs.,
Rs. 11,23,406; To Chicago: Chemie-
quip Ltd., 8,000 Kgs., Rs. 8,51,064;
000 Kgs., Rs. 8,59,576; To Chicago:
y Chemical Inds., 10,000 Kgs.,
Rs. 8,95,000; To Colombo: 1,500 Kgs.,
Rs. 1,31,900; Amritlal Chemaux Pvt.
Ltd., 1,000 Kgs., Rs. 48,355; To Dubai:
ddharth Exports, 960 Kgs.,
Rs. 32,300; To Felixstowe: IDI Ltd.,
750 Kgs., Rs. 24,24,221; Subashri
chemicals Pvt. Ltd., 4,100 Kgs.,
Rs. 2,40,000; To Genoa: Chika Ltd.,
000 Kgs., Rs. 4,85,319; Karsandas
avji, 500 Kgs., Rs. 51,563; Liberty
Exports Ltd., 5,000 Kgs., Rs. 4,80,962;
Metro Chem Intl., 5,000 Kgs.,
Rs. 5,11,013; To Hong Kong: Atul Pro-
ducts Ltd., 1,000 Kgs., Rs. 2,63,336; To
ong Kong: Bhoir Import Export Pvt.
Ltd., 3,000 Kgs., Rs. 3,07,236; Blue
ock Dyes & Chem Pvt. Ltd., 2,000
Kgs., Rs. 1,94,843; Indokem Ltd., 300
Kgs., Rs. 43,030; Jay Chemical Inds.,
000 Kgs., Rs. 3,00,000; Monarch
dyestuffs Inds., 1,000 Kgs.,
Rs. 2,05,957; Space International, 1,275
Kgs., Rs. 1,76,459; Valia Chemical Pvt.
Ltd., 1,000 Kgs., Rs. 2,06,000; To
akarta: Anil Dyechem Inds. Pvt. Ltd.,
000 Kgs., Rs. 4,38,808; Ashish
chemicals, 6,000 Kgs., Rs. 6,77,361;
Golden Dyes Corpn., 5,923 Kgs.,
Rs. 4,91,700; Jaytex Dyes & Chemicals
Ltd., 1,000 Kgs., Rs. 1,50,000;
Mangalya Trading & Investment Ltd.,
000 Kgs., Rs. 2,82,000; Pearl Enter-
prises, 2,000 Kgs., Rs. 1,60,000; To
clung: Priya Electronics & Chemi-
s, 3,000 Kgs., Rs. 2,26,393; Jay
chemical Inds., 8,000 Kgs.,
Rs. 12,06,000; Jindal Dye & Interme-

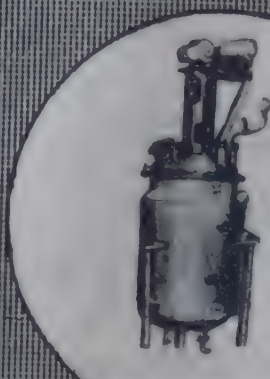
diates Pvt. Ltd., 1,000 Kgs.,
Rs. 1,72,521; To Leinoes: Jaysynth
Dyechem Ltd., 500 Kgs., Rs. 1,50,213;
To Liverpool: Atic Inds. Ltd., 5,950
Kgs., Rs. 21,42,567; Jindal Dye Inter-
mediates Pvt. Ltd., 3,500 Kgs.,
Rs. 4,12,600; To London: Devarsons
Pvt. Ltd., 1,800 Kgs., Rs. 4,40,000;
Ravi Chem Dye, 21,000 Kgs.,
Rs. 2,01,595; To Mombasa: IDI Ltd.,
500 Kgs., Rs. 2,11,000; Jaysynth
Dyechem Ltd., 2,500 Kgs.,
Rs. 5,48,085; To Manila: Space Inter-
national, 4,000 Kgs., Rs. 2,34,042; To
New York: Amritlal Chemaux Ltd.,
1,200 Kgs., Rs. 5,45,140; To New
York: Atic Inds. Ltd., 5,547.27 Kgs.,
Rs. 37,68,085; Golden Dyes Corpoar-
tion Pvt. Ltd., 1,000 Kgs., Rs. 2,64,000;
Ravi Chem Dye, 12,000 Kgs.,
Rs. 13,15,531; Uni Impex India, 3,000
Kgs., Rs. 3,52,553; To Odessa: Usha
International India, 4.5000 Mts.,
Rs. 5,67,000; To Osaka: Atic Industries
Ltd., 5,212.94 Kgs., Rs. 39,11,461; To
Port Kelang: Little & Company, 250


Kgs., Rs. 15,329; Sahyadri Dyestuffs &
Chemicals, 475 Kgs., Rs. 1,05,000; To
Priok: Uni Impex India, 2,500 Kgs.,
Rs. 3,43,447; To Rotterdam: Chemie-
quip Ltd., 500 Kgs., Rs. 79,285; Chika
Ltd., 1,000 Kgs., Rs. 42,963; Formo-
kem Corpn., 2,000 Kgs., Rs. 5,20,000;
IDI Ltd., 300 Kgs., Rs. 10,700 Karsan-
das Mavji, 1,000 Kgs., Rs. 99,639;
Mahalaxmi Chemical Works, 1,000
Kgs., Rs. 4,98,926; Mangalya Trading
& Investment, 750 Kgs., Rs. 3,24,000;
Metro Chem Inds., 12,000 Kgs.,
Rs. 10,39,745; Monarch Dyes Inds.,
7,000 Kgs., Rs. 6,39,780; Navin Chem-
ical Enterprises, 10,000 Kgs.,
Rs. 10,04,820; Valia Chemicals Pvt.
Ltd., 2,000 Kgs., Rs. N.A.; To Singa-
pore: Atlas Dye-Chem Inds., 4,000
Kgs., Rs. 4,19,638; Bhoir Import
Export Pvt. Ltd., 1,000 Kgs.,
Rs. 1,57,446; Espee Chemicals,
2,127.70 Kgs., Rs. 1,72,630; K. Patel
Chemo Pharma Pvt. Ltd., 1,600 Kgs.,
Rs. 1,55,000; Mivin Overseas 2,000
Kgs., Rs. 1,74,468; To Tilbury: Navin-

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Chemical Enterprises, 1,000 Kgs., Rs. 2,15,000; To Yokohama: Chemex Works, 2,000 Kgs., Rs. 1,56,595.

FAST BETA BLUE SPL: To Colombo: Colour-Chem Ltd., 675 Kgs., Rs. 48,630.

FAST BLUE CBR: To Colombo: Colour-Chem Ltd., 150 Kgs., Rs. 15,733.

FAST ORANGE CG: To Colombo: Colour-Chem Ltd., 1,000 Kgs., Rs. 11,800.

FAST RED B: To New York: Atul Products Ltd., 6,500 Kgs., Rs. 8,46,638.

FAST RED B BASE: To New York: Monarch Dyestuffs Ltd., 1,000 Kgs., Rs. 1,39,574.

FAST RED B BASE STD: To Charleston: Jansons Intl., 2,000 Kgs., Rs. 2,66,383.

FAST RED F4R 747: To Colombo: Colour-Chem Ltd., 50 Kgs., Rs. 6,646.

FAST RED R BASE: To Kobe:

Mahalaxmi Chemical Works, 500 Kgs., Rs. 64,681.

FAST RED TR BASE: To Rotterdam: Vipul Dyes and Chemicals Pvt. Ltd., 7,500 Kgs., Rs. 9,62,000.

FAST YELLOW CG: To Colombo: Colour-Chem Ltd., 1,225 Kgs., Rs. 71,575.

FAST YELLOW DHG SPL: To Harare: The Minerals & Metals Trading Corp., 1,500 Kgs., Rs. 3,15,319.

FAST SCARLET R BASE: To New York: Toshniwal Exports, 4,192 Kgs., Rs. 5,69,617.

GREEN FB EX CONC.: To Bangkok: Colour-Chem Ltd., 1,000 Kgs., Rs. 89,220.

GREEN FB EX. CONC.: To Singapore: Colour-Chem Ltd., 200 Kgs., Rs. 16,611.

HANSA YELLOW G: To Colombo: Colour Chem Ltd., 25 Kgs., Rs. 4,282.

LAKE RED TONER LCLL: To

Colombo: Colour-Chem Ltd., 25 Kgs., Rs. 1,675.

LAKE SCARLET CTL: To Colombo: Colour-Chem Ltd., 150 Kgs., Rs. 10,054.

MALACHITE GREEN POWDER: To Rotterdam: Chika Ltd., 12,000 Kgs., Rs. 12,80,000.

METHYL VIOLET: To Singapore: K. Patel Chemo Pharma Pvt. Ltd., 1,000 Kgs., Rs. 1,15,000.

METHYL VIOLET 2B PDR: To Buenos Aires: Ravi Chem Dye, 300 Kgs., Rs. 47,566.

METHYLENE BLUE B5: To Buenos Aires: Ravi Chem Dye, 100 Kgs., Rs. 21,757.

NAPHTHOL AS: To Odessa: Amar Dye Chem Ltd., 8,400 Kgs., Rs. 9,74,400.

NAPHTHOL AS-SW: To Hamburg: Associated Intermediates & Chemicals, 500 Kgs., Rs. 1,08,000.

NOVATIC BLACK NB: To New York: Alic Industries Ltd., 1,374 Kgs., Rs. 6,41,702.

NAVINON YELLOW GCN: To Hamburg: Mangalya Trading & Invt. Ltd., 250 Kgs., Rs. 89,000.

OLIVE GREEN FB EX. CONC.: To Colombo: Colour-Chem Ltd., 100 Kgs., Rs. 1,434.

ORANGE FR: To Bangkok: Colour Chem Ltd., 750 Kgs., Rs. 64,979.

OPTICAL WHITENING AGENT: To Bangkok: IDI Ltd., 2,000 Kgs., Rs. 1,13,000; To Los Angeles: IDI Ltd., 1,364 Kgs., Rs. 6,13,000.

ORGANIC PIGMENTS: To Colombo: Colour-Chem Ltd., 12.9 Kgs., Rs. 6,994.

PERMANENT YELLOW DHG: To Colombo: Colour Chem Ltd., 600 Kgs., Rs. 43,170.

PHTHALOCYANINE: To Bangkok: Colour Chem Ltd., 900 Kgs., Rs. 1,35,370.

AMMONIUM NITRATE (Melt)
AMMONIUM MOLYBDATE
ACETAMIDE * HYPO
CALCIUM NITRATE
CALCIUM STEARATE
COBALT SULPHATE
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THALOCYANINE BLUE 2636: Colombo: Sudarshan Chemical Inds. 200 Kgs., Rs. 24,390.

THALOCYANINE GREEN GN: Colombo: Colour Chem Ltd., 50 Kgs., Rs. 4,844.

THALOCYANINE GREEN: To Colombo: Sudarshan Chemical Ind. 200 Kgs., Rs. 23,930.

THALOCYAMINE GREEN: To Keelung: Sudarshan Chemical Inds. Ltd., 1,300 Kgs., Rs. 2,85,106.38.

THALOCYANINE GREEN: To Colombo: Colour Chem Ltd., 50 Kgs., Rs. 39,554; To Jakarta: Colour Chem Ltd., 1,000 Kgs., Rs. 1,87,489; To Singapore: Colour Chem Ltd., 2,000 Kgs., Rs. 3,26,170.

PIGMENTS: To Bangkok: Sanjay Sales Corpn., 600 Kgs., Rs. 1,01,316; To Hong Kong: Sudarshan Chemical Inds. Ltd., 1,000 Kgs., Rs. 1,93,838; To Rotterdam: Sanjay Sales Corpn., 2,000 Kgs., Rs. 3,96,717; To Singapore: Sanjay Sales Corpn., 1,000 Kgs., Rs. 1,37,280.

PIGMENT GREEN 807: To Hong Kong: Sudarshan Chem Inds. Pvt. Ltd., 500 Kgs., Rs. 1,18,047.

PIGMENT LAKE RED LC: To Colombo: Colour-Chem Ltd., 50 Kgs., Rs. 3,350.

ANGAZOL GOL. YELLOW: To Charleston: Janson Intl., 1,500 Kgs., Rs. 2,62,127.

REACTOFIX NAVY BLUE ME 2: To Antwerp: R.P. Trading Co., 500 Kgs., Rs. 97,000.

REACTOFIX SUPRA GREEN: To Jansan: Jaysynth Dyechem Ltd., 940 Kgs., Rs. 1,63,404.

REACTOFIX SUPRA TURQ: To Jansan: Jaysynth Dyechem Ltd., 1,000 Kgs., Rs. 1,49,707.

REACTOFIX SUPRA YELLOW: To Sydney: R.P. Trading Co., 50 Kgs., Rs. 2,46,808.

REACTOFIX SUPRA YELLOW: To Genoa: Jaysynth Dyechem Ltd., 3,000 Kgs., Rs. 6,43,404.

REACTIVE BLACK: To Charleston: Jansons Intl., 5,000 Kgs., Rs. 5,47,234; To Genoa: Metro Chem Inds., 3,000 Kgs., Rs. 2,80,851.

REACTIVE BLUE: To Charleston: Jansons Intl., 2,000 Kgs., Rs. 3,91,489.

REACTIVE DARK BLUE: To Antwerp: Kantilal Sanghvi & Co., 1,000 Kgs., Rs. 1,64,329.

REACTIVE DYES: To Jakarta: Vivid Exports Pvt. Ltd., 750 Kgs., Rs. 95,132; 500 Kgs., Rs. 1,01,821; To Keelung: Archana Finance Corpn., 5,000 Kgs., Rs. 4,40,000.

REACTIVE ORANGE: To Manchester: Associated Intermediates & Chemicals, 400 Kgs., Rs. 67,000.

REACTIVE RED 5B: To Mombasa: Roffe Impex International Pvt. Ltd., 300 Kgs., Rs. 36,766.

REACTIVE RED 141/ME7B: To Charleston: Integrated Trading co., 1,000 Kgs., Rs. 1,48,034.

REACTIVE TURQUOISE BLUE BP: To Charleston: Swastik Work Trade Corpn., 1,000 Kgs., Rs. 1,15,000.

REACTIVE TURQ. BLUE HA: To Rotterdam: Mivin Overseas, 1,000 Kgs., Rs. 1,88,936.

REACTIVE YELLOW: To Charleston: Jansons International, 1,000 Kgs., Rs. 2,77,446; To Hamburg: Valia Chemicals Pvt. Ltd., 1,000 Kgs., Rs. 3,06,382.

REACTIVE YELLOW 15: To Charleston: Jansons Intl., 7,000 Kgs., Rs. 14,72,339; To Genoa: Metro Chem Inds., 1,000 Kgs., Rs. 1,74,896.

REACTIVE YELLOW HEAR: To Liverpool: Karsandas Mavji, 1,000 Kgs., Rs. 1,34,854.

RED FRG EX. CONC: To Colombo: Colour Chem Ltd., 50 Kgs., Rs. 6,744.

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REMAZOL BRILLIANT ORANGE 3R: To Bangkok: Colour Chem Ltd., 2,000 Kgs., Rs. 2,92,034.

RHODAMINE: To Liverpool: Indian Dyestuffs & Chemicals Mfg., 2,000 Kgs., Rs. 4,83,454.

RUBINE TONER C6B: To Colombo: Colour Chem Ltd., 100 Kgs., Rs. 7,823.

SCARLET CHROME 1483: To Bangkok: Sudarshan Chemical Inds., 1,000 Kgs., Rs. 54,178.

S.F. YELLOW DHG: To Colombo: Sudarshan Chemical Inds. Ltd., 200 Kgs., Rs. 30,350.

S.F. RED FLR 323: To Colombo: Sudarshan Chemical Inds. Ltd., 200 Kgs., Rs. 38,920.

TOLUIDINE RED 40%: To Manila: Sudarshan Chemical Inds., 1,000 Kgs., Rs. 1,53,821.

TURQUOISE BLUE: To Keelung: Sanjay Sales Corpn., 500 Kgs., Rs. 82,629.

VAT GREEN FFB: To Genoa: Karsandas Mavji, 1,000 Kgs., Rs. 3,71,736.

VAT ORANGE: To Rotterdam: French Dyes & Chemicals, 2,000 Kgs.,

Rs. 1,84,000.

VIOLET FFR: To Penang: Colour Chem Ltd., 300 Kgs., Rs. 33,760.

ULTRAMARINE BLUE: To Bahrain: Balsara Hygiene Products Ltd., 290 Kgs., Rs. 12,100.

ULTRAMARINE BLUE IND: To Damman: Balsara Hygiene Products Ltd., 36 Kgs., Rs. 7,500.

YELLOW DHG: To Colombo: Colour Chem Ltd., 50 Kgs., Rs. 3,525.

YELLOW FGM EX. CONC: To Singapore: Colour Chem Ltd., 25 Kgs., Rs. 1,459.

YELLOW GR: To Colombo: Colour Chem Ltd., 50 Kgs., Rs. 6,894.

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AMOXYCILLIN BP 88: To Hamburg: Armour Chemicals Limited, 3,190 Kgs., Rs. 32,48,340.

AMOXYCILLIN TRIHYDRATE BP 88/USP: To Copenhagen: Gujarat

Lyka Organcis Ltd., 700 Kgs., Rs. 7,49,787.

AMPICILLIN TRIHYDRATE: To Odessa: Ranbaxy Laboratories, 6,000 Kgs., Rs. 57,30,000; To Russia: Allanasons Ltd., 7,500 Kgs., Rs. 71,62,500.

AMPICILLIN TRIHYDRATE: To Copenhagen: Supriya Drugs Pharmaceuticals, 1,250 Kgs., Rs. 10,65,532; To Odessa: Gujarat Lyka Organics Ltd., 7,500 Kgs., Rs. 71,62,500; To Port Kelung: Easian Inds., 250 Kgs., Rs. 2,57,200.

CHLORPHENIRAMINE MAATE: To Bangkok: Venkatrama Chemicals Ltd., 500 Kgs., Rs. 2,96,608; To Genoa: IPCA Laboratories Ltd., 1,000 Kgs., Rs. 1,27,700.

CHLORPHENIRAMINE MAATE BP: To Hamburg: Venkatrama Chemicals Ltd., 1,000 Kgs., Rs. 6,16,216.

CHLORPHENIRAMINE MAATE BP 88: To Hamburg: MePharmaceuticals Inds., 450 Kgs., Rs. 2,88,000.

CHLOROQUINE PHOSPHATE: To Hamburg: IPCA Laboratories Ltd., 23,175 Kgs., Rs. 9,65,000.

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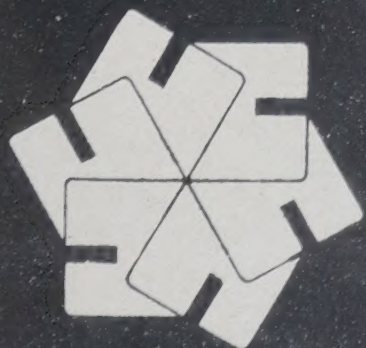
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